OCTOBER 11, 1941

# THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, CHEMISTRY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 6163 LONDON: SATURDAY, OCTOBER 11, 1941 CCXLI

## CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

**ORIGINAL ARTICLES***

Cysticercosis of the Brain, with Epilepsy and Papilloedema.
By W. E. CARNEGIE DICKSON, F.R.C.P.E., and Captain J. D. WILLIS, M.R.C.P. ..... 415

Silicosis in Stourbridge Fireclay Miners.
By SIDNEY DEANER, M.R.C.S. ..... 417

A Case of Syphilis of the Lungs.
By ARNOLD CLARK, M.R.C.P. ..... 420

Action of Bismuth Carbonate in Gastric Disease.
By STANLEY ALSTEAD, M.R.C.P. ..... 420

Blast Injury of the Lungs: Severe Cases — Cases with Damage to Chest Wall — Slight Cases — Clinical Features — Physical and Radiological Signs — Pathological Findings — Treatment — Diagnosis.
By J. N. O'REILLY, M.R.C.P., and S. ROODHOUSE GLOYNE, M.D. ... 423

**IN ENGLAND NOW**

A Running Commentary by Peripatetic Correspondents ..... 435

**LEADING ARTICLES**

BIPP AND ITS FRIENDS .... 429

CARE OF THE TEETH ..... 430

COOLING DRUGS AND COOLING CENTRES ..... 431

**ANNOTATIONS**

Radiology as a Career ..... 432

Foundation of the Nutrition Society ..... 432

Electrolytic Sodium Hypochlorite ..... 433

The Rickettsiases ..... 433

Osteomyelitis of the Spine 433

Growth of the Ovarian Follicle ..... 434

Plantar Response in Healthy Infants ..... 434

Syphilis of the Lung ..... 434

**REVIEWS OF BOOKS**

Bone Graft Surgery in Disease, Injury and Deformity. By Fred H. Albee, F.A.C.S. ..... 428

Medical Diseases of War. By Sir Arthur Hurst, F.R.C.P. ..... 428

Medico-Legal Post-Mortem in India. By Major D. P. Lambert, M.D. ..... 428

Plant Science Formulæ. By Prof. R. C. McLean, D.SC., and W. R. Ivimey Cook, PH.D. ..... 428

**LETTERS TO THE EDITOR**

Medical Aspects of Boxing (Captain Ernst Jokl, S.A.M.C.) ..... 438

Exclusion of Neurotics from the Forces (Dr. R. Sessions Hodge) ..... 439

Home Guard Problems (Mr. H. Marcus Bird, M.R.C.S., Miss J. Elise Gordon) ..... 439

Corrosive Stricture of the Stomach (Mr. Cecil A. Joll, F.R.C.S.) ..... 439

Stretcher Support for Thomas Splint (Dr. T. Philips Cole) (*illus.*) ..... 440

Wasp and Bee Stings (Dr. Osmond H. Brown) ..... 440

Ingrowing Toenail (Mr. Radley Smith, F.R.C.S.) (*illus.*) ..... 440

**PARLIAMENT**

Food Production and Distribution—Plans for Tomorrow—Wives without Children ..... 436

Question Time: Medical Advisory Committees—C.M.W.C. and Home Guard — Medical Manpower—Alien Doctors—Milk in Schools—Milk for the R.A.F. and others—Medical Prisoners of War — Increase in Tuberculosis — Medical Aid for China — Annual Reports ..... 437

**OBITUARY**

Charles Leonard Digby Roberts, M.B. ..... 440

**NOTICES**

Home Guard Medical Arrangements.
By Brigadier E. M. COWELL, F.R.C.S. ..... 442

The Tooth of the Dane .... 442

Science and Ethics ..... 442

Shilling a Night ..... 442

**MEDICAL NEWS**

Royal College of Surgeons of England ..... 441

University of Birmingham 441

C.S.M.M.G. Salaries ..... 441

Naval Honours ..... 441

Medical Casualty ..... 441

Medical Society of London 441

Shaftesbury Military Hospital Medical Society ... 441

Royal Medical Society of Edinburgh ..... 441

Hospital Survey in Bristol and District ..... 438

Royal College of Obstetricians and Gynæcologists 442

The Loan of a Microscope 442

Infectious Disease in England and Wales ..... 440

Births, Marriages and Deaths — Appointments 441

** Each of the original articles is illustrated on the Plate*

THE LONDON AND COUNTIES
MEDICAL PROTECTION SOCIETY, Ltd.

President: SIR CUTHBERT S. WALLACE, K.C.M.G., C.B., F.R.C.S.

Members receive UNLIMITED INDEMNITY (subject to the Articles of Association) against damages and costs in cases undertaken on their behalf and advice and assistance in all matters of professional difficulty.

**The estate of a deceased member is similarly protected.**

Assets exceed £80,000

Annual Subscription £1

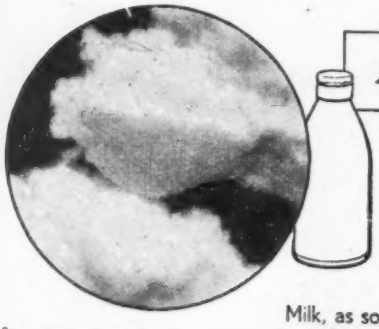
Entrance Fee 10s.
(REMITTED TO RECENTLY QUALIFIED PRACTITIONERS)

*Full particulars and application form from :—*
Dr. R. W. DURAND, Secretary, VICTORY HOUSE, LEICESTER SQUARE, W.C.2. Gerrard 4553, 4814.

*ILLUSTRATING*

# the Breakdown of Milk Protein

## by Benger's Food




Milk, as soon as it comes in contact with the gastric juice, forms heavy curds. Many children and adults cannot properly digest these curds, and they cause pain and discomfort to persons with impaired digestion. For this reason many who most need milk are denied its great benefits.

As soon as hot milk is poured on to Benger's Food the active pancreatic enzymes, held dormant in its wheaten base become active. Within a very short period — less time than it takes the milk and Food to become cool enough to drink — the milk protein is modified so that only very finely divided curds can form upon contact with the gastric juice. At the same time the starch in the wheaten base of Benger's Food has been rendered soluble with the formation of dextrins, dextri-maltoses and maltose. By virtue of these active digestive enzymes Benger's Food, prepared with fresh milk, forms in the stomach finely divided flocculi, which present a huge surface area for digestion.

Sole Manufacturers: BENGER'S Ltd., Holmes Chapel, Cheshire, Eng.

*The Benger Laboratories are always at the disposal of the medical profession in any of their dietetic problems.*

2] T.6

"OXOID"

*The word "OXOID" is the trade mark of OXO Ltd., and is used in connection with their therapeutical preparations both in tablet and fluid extract form.*

ORGANO-THERAPEUTICAL PRODUCTS

OXO LABORATORY PREPARATIONS

FOR PERNICIOUS ANÆMIA

OXO LTD'S

LIVER EXTRACT

For INJECTION, (I.M.)

The potency of "OXOID" Brand Liver Extract for Injection in the treatment of Pernicious Anaemia is guaranteed.

The usual maintenance dose is 2 c.c. injected at weekly or fortnightly intervals. Dosage for emergency use is 4 c.c. for the first day and 2 c.c. on alternate days.

Supplied in ampoules of 2 c.c. and bottles of 10 c.c. and 20 c.c.

*Ampoules:* 6 (6/6); 12 (12/6); 50 (48/-); 100 (92/-).

*Bottles:* 10 c.c. (4/9); 20 c.c. (8/6).

"ERYTHOID"

"Erythoid" is desiccated gastric tissue, manufactured at a low temperature.

An efficient preparation and can be confidently recommended as an alternative or a substitute for liver in the treatment of Pernicious Anaemia.

Put up in Vials, each of which contains 15 grams of desiccated gastric tissue; and can be administered by mouth, mixed with milk.

*In boxes of 10 Vials (7/6).*

*Literature supplied on application.*

OXO LIMITED, Thames House, London. E.C.4

OXO LABORATORY PREPARATIONS

MISSING PAGES ARE ADVERTISING PAGES.
THIS IS THE BEST COPY AVAILABLE FOR
PHOTOGRAPHY.

# ORIGINAL ARTICLES

## CYSTICERCOSIS OF THE BRAIN WITH EPILEPSY AND PAPILLŒDEMA

W. E. CARNEGIE DICKSON, M.D., B.SC. EDIN., F.R.C.P.E.
DIRECTOR, PATHOLOGICAL DEPARTMENT, WEST END HOSPITAL FOR NERVOUS DISEASES

J. D. WILLIS, M.B. N.Z., M.R.C.P.
CAPTAIN, N.Z.M.C.; FORMERLY RESIDENT MEDICAL OFFICER AT THE HOSPITAL

SINCE the work of MacArthur[1] at Millbank, infestation of the brain and eye with the larval cysts of *Tænia solium* has been recognised as less uncommon and more important than was formerly supposed; and it seems likely that infestation with tapeworm will be frequent among our forces in the Near and Middle East. When previously healthy and often comparatively young soldiers, especially any who have been abroad, for example in India, have been invalided out of the service because of "epilepsy," the diagnosis in many instances has, on further investigation, proved to be an infestation with cysticerci. The epileptiform fits were usually accompanied by severe and otherwise unaccountable headaches and various obscure nervous symptoms. In fatal cases, sometimes as many as 300 or 400 cysts have been found in a single brain; and in these patients there has, as a rule, been no definite history of any previous intestinal tapeworm-infestation. Almost all the cases recorded in this country have been in soldiers, or in soldiers' families.

The case which we record here gives a typical clinical history, and also illustrates several other important points upon which MacArthur lays especial emphasis, for instance, that serious cerebral symptoms supervene as a rule only when death and degeneration of the larvæ themselves have taken place; this is because the cysts then tend to swell from imbibition of fluid, and irritative phenomena supervene in and around them (fig. IIb and lower specimen in fig. IV, plate).

While the parasite is still alive it becomes surrounded and shut off by a zone or capsule of thickened and proliferated glia and a varying amount of fibrous tissue; and, unless the cysticercus is in some specially vital position in the brain, a species of symbiotic harmony between parasite and host is established, which may last for several and perhaps for many years. Serious pathological results thus in many instances ensue only on and after the death of the parasites, so that attempts at killing them by drugs must as yet be regarded as ill-advised, as is also the attempted surgical removal of any of the cysts in the brain, unless they are causing serious symptoms on account of their position, or, as in the present case, because the rather unusual complications of progressive papillœdema and raised intracranial pressure threaten the patient's eyesight.

Since the larvæ often survive "symbiotically" for a number of years, the more active destructive and necrotic changes around them leading to the epileptiform seizures may not come on until after a considerable "latent period." If the patient does not die in the meantime, the zone of glial and fibrous-tissue sclerosis around the dead and degenerating cysticerci gradually becomes more pronounced; and calcification, beginning in the scolex itself and gradually involving the cyst-wall, tends to be produced—perhaps only after three or four years—and X-ray diagnosis may only then become possible.

At this late stage in the development of the disease, the occurrence of eosinophilia in the blood is exceptional, and the specific serum-reactions are often negative. If, as in the present case, cysticerci can be palpated in the subcutaneous or muscular tissues or demonstrated in radiograms, the diagnosis may be confirmed by the examination of biopsy-specimens (fig. I, plate, and fig. II).

### CASE-RECORD

A man of 32 was admitted to hospital under Dr. Neill Hobhouse on Jan. 23, 1940, complaining of "fainting turns" for three years, and severe frontal and occipital headaches for a month. A diagnosis of cysticercosis had been made by Dr. Macdonald Critchley in 1938. The patient had been an infantryman in India from 1927 to 1933, and during that time he had a considerable amount of illness, including "dysentery" twice, threadworm-infestation twice, and several attacks of "P.U.O."; but, as far as he himself was aware, he had never suffered from intestinal tapeworm-infestation. Previous to going to India, he had never suffered from fits of any kind, and there was no family history of epilepsy. In 1937 he became a post-office employee, and three months later had his first epileptiform attack, his own description of this being: "I was just walking along when suddenly everything went black and I dropped." He was unconscious for only two or three minutes and was told that he had had generalised twitching of the limbs, but no cyanosis, nor was there any incontinence of urine or biting of the tongue. He had a second attack six months later, beginning with "twitching of both elbows and shoulders." In subsequent fits this twitching constituted a premonitory "aura," giving him time to lie down. These attacks came on at intervals of five or six months, with freedom from any symptoms between times. His last attacks—two in one day—had occurred five weeks previous to admission and began with cramp-like flexion of the fingers of the left hand into the palm and pain shooting up the forearm, followed by unconsciousness, on recovery from which he found that he had temporarily lost the use of his left hand, a disability which lasted nearly a week. Intermittent severe frontal headaches then supervened, shooting round the right side of the head to the occiput, with pain in the back of the neck and mistiness of vision in the right eye. There was no nausea or vomiting. In 1938, a tense subcutaneous nodule about ½ in. in diameter was detected at the right costal margin near the ninth costal cartilage.

The patient was well-nourished, intelligent and fully coöperative. Two other tense and painless subcutaneous nodules about ¼ in. in diameter were found in the lower thoracic region, one on each side of the vertebral column about 2 in. from the midline. Cranial nerves: pupils of medium size, equal, central and circular; pupillary reactions normal. Vision 6/12 in each eye; visual fields full. Fundi (Mr. Joseph Minton) showed papillœdema on both sides, + 1·5 D, with hæmorrhage and exudate around both discs. There were coarse lateral nystagmoid jerks both to right and left. Tongue deviated to the right when extended. Other cranial nerves normal. Absent upper abdominal reflexes but no other abnormal physical signs found. No nodules were palpable in the limbs. By Jan. 26 the papillœdema had increased to 3 D in the left eye, and to 2 D in the right; it was therefore decided to perform a ventriculography to ascertain if possible the position of any block in the cerebrospinal circulation.

Jan. 25. Examination of blood. Coagulation-time 3½ min.; bleeding-time not prolonged. Red cells 4,900,000, hæmoglobin (Haldane) 90%, colour-index 0·92; white cells 7400 (polymorphs 47·5%; lymphocytes, small 34·5%, large 10·5%, total 45%; large monocytes 1·5%; eosinophils 6%; basiphils 0)—i.e., a moderate eosinophilia, with some neutropenia and a relative lymphocytosis, a considerable proportion of the lymphocytes being of large (more immature) type.

Jan. 27. Lumbar puncture. Pressure 300 mm. of water; fluid clear and colourless. Cells 29 per c.mm. (small lymphocytes 91%, small endothelial cells 6%, large endothelial cells 3%, polymorphs 0, red cells 0); total protein 0·06%; globulin a faint trace in excess; Lange's colloidal-gold curve, 0 : 1/0 : 1/0 : 1 : 1/0 : 0 : 0 : 0 : 0 : 0. Wassermann and Meinicke reactions in blood negative. On X-ray examination of the skull, two small rounded suspicious shadows (one about the centre of the right parietal cortical region and the other just below and ¾ in. to the left of the shadow of the calcified pineal) were seen in the anteroposterior view but not in the lateral. In the soft parts around the pelvis and in the upper and lower limbs and neck, typical shadows of calcified cysticerci were demonstrated (fig. I).

On Jan. 30 a ventriculography was done, but no abnormality was detected in the ventricular system. The fluid from the right lateral ventricle was clear and colourless and showed: cells 1 (small lymphocyte) per c.mm.; total protein 0·01%; globulin no excess; Wassermann and Meinicke reactions negative; Lange's colloidal-gold curve, 0 : 0 : 1/0 : 0 : 0 : 0 : 0 : 0 : 0 : 0.

The ventriculography was followed by a right subtemporal decompression by Mr. Geoffrey Knight. The meninges were under considerable tension, and on opening them several small firm nodules were palpable just beneath the surface of

the cortex in both the motor and sensory areas. Two of these were excised for microscopical examination (fig. II*b*). The patient's immediate post-operative condition was good, some temporary paresis of the long finger-flexors of the left hand gradually passing off and there being no appreciable sensory changes. Ten days later the papillœdema had subsided to 0·5 D in the right and 1 D in the left eye, and there was mild analgesia to pin-prick and cotton-wool and two-point discrimination over the left palm. All of these signs gradually passed off except for flexor paresis of the left index finger. On Feb. 9 two subcutaneous cysticercal cysts were removed from the patient's back for biopsy (fig. II*a*).

Feb. 14. The patient had an epileptiform attack similar to those from which he had suffered before admission; and during the subsequent three weeks there was flaccid paralysis of, and loss of sensation over, the left hand and forearm, and several Jacksonian attacks occurred in the paralysed limb. There was then rapid improvement, with return of power of movement, the cortical sensory loss being the last to recover.

On April 3 the patient was discharged in excellent condition, with the decompression-area well healed. The optic discs were flat and showed no evidence of the previous papillœdema, vision being as on admission (R.V. and L.V. 6/12), and there were now no appreciable motor or sensory differences in the two arms.

Figs. II*a* and *b* are from sections of the biopsy-specimens excised from the lumbar muscles and brain respectively. In fig. II*a* the larva is healthy and well-preserved; but, in fig. II*b*, that from the right motor cortex shows a typically degenerated dead larva enclosed in a calcified cyst, previously tensely distended, but which had ruptured and become collapsed during surgical removal. For comparison with these, fig. III is from a post-mortem specimen of a brain of an ex-soldier aged 28, which we owe to the kindness of Dr. C. Worster-Drought. It shows the naked-eye appearance and distribution of the cysticerci in the brain (the right half of which was examined and in which it was estimated that there were about a hundred cysts present).[3] Fig. IV, from this brain, shows in adjacent convolutions in the same section a healthy "symbiotic" cysticercus lying within its caudal vesicle or bladder; while below is a dead and disintegrating larva in a degenerated cyst which is becoming distended with fluid and the wall of which shows the development of irritative and chronic inflammatory reaction after the death of the parasite, as noted by MacArthur. Details of the upper cyst are shown in fig. V.

*a* *b*

FIG. II—(*a*) Biopsy-specimen of cysticercus from lumbar muscles of case recorded in text. Oblique section of scolex passing through two of the four suckers and base of rostellum with its armature of hooklets and its musculature. Compare the well-preserved structure of this undegenerated and "symbiotic" larva with the dead and degenerated parasite from the brain illustrated in (*b*). This shows one of two cysts removed from the hand-area of the right motor cortex. The cyst, which burst and became collapsed during removal, is partially calcified. Mallory's connective-tissue stain × 50.

## DISCUSSION

Attention has been drawn in several recent papers and articles[3] to the comparative frequency with which

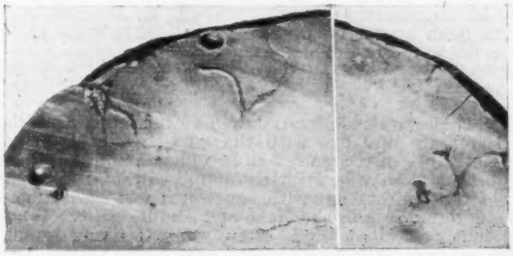


FIG. III—Cysticercosis of brain of an ex-soldier aged 28, who had enlisted at the age of 18. (Left): in, or just beneath, the frontal cortex are one degenerating and two well-preserved cysts; whilst (right) in the occipital cortex are seen one semi-degenerated and shrivelled, and two old degenerated and fibrosed, cysticerci. Dr. Worster-Drought's case, half natural size.

the brain is attacked in patients with cysticercosis—in different series varying from 40 to 75 or 80% of the total number. The eye itself may be the site of infestation which may destroy the sight, as in Worster-Drought's case. Hugh Cairns, in the discussion which followed MacArthur's paper, was of opinion that "there was no place for operative surgery in cases of multiple cysticerci of the brain," and none of the patients he had seen had anything beyond a slight degree of papillœdema. "It was conceivable that there might be such cases (e.g., a cyst in the precentral gyrus) in which surgery could help, but they must be rare." The case we now record appears, therefore, to be one of those rare instances in which sight was threatened by a progressive bilateral papillœdema and the raised intracranial pressure, and in which surgical interference was justified by the results obtained—the rapid disappearance of the papillœdema and the lowering of the intracranial pressure, as well as the reduction in the frequency of the fits following the subtemporal decompression.

In his series of 61 patients with cerebral cysticercosis, MacArthur mentions only one case in which any serious degree of papillœdema led to blindness some time before death; while in Dixon and Smithers's[4] review of 71 cases there were only 7 with papillœdema. More recently, Gottlieb[5] described a case of cysticercosis in a girl, aged 17, with epilepsy, 2 diopters of papillœdema in both eyes, a cerebrospinal-fluid pressure in excess of 300 mm. of water, and numerous calcified cysts in the brain demonstrable radiographically.

As shown in fig. III, most of the cysts lie within the cortex, or just beneath it, relatively few being found in the meninges or deeply within the white matter. Although collectively they represent a considerable space-occupying lesion, individually they produce comparatively little interference with the cerebrospinal-fluid circulation, and this is perhaps the explanation of the relative infrequency of papillœdema or of raised intracranial pressure, the occurrence of which probably indicates swelling of the brain around degenerating cysts such as that illustrated in the lower part of fig. IV. No evidence of hydrocephalus was found in the ventriculograms, which showed a normal ventricular system.

The character of the epileptiform attacks depends largely on the site of the cysts, as well as on the occurrence of the degenerative reaction and swelling around and in the dying or dead cysticerci. The symptoms sometimes produced may simulate those of acute encephalitis, disseminated sclerosis or cerebral tumour; and in some patients, with or without fits, psychical symptoms may predominate and resemble melancholia, acute mania, schizophrenia or certain less grave mental disorders.

When in the subcutaneous tissues and muscles, the swellings, if numerous, may simulate von Recklinghausen's peripheral neurofibromatosis or even nodular leprosy (Greig).[6] As is well known, the cysts when in the muscles and near the surface of the body often become

palpable or even visible in "crops." This is due to a sudden increase in their fluid-content following the death of the larva, rather than to the development of new parasites—previously flaccid and inconspicuous cysts becoming tense and palpable. It is conceivable that, in a similar way, several cysts in certain parts of the brain, particularly if situated in the vicinity of the mid-brain and below the tentorium, might simultaneously become swollen and obstruct the cerebrospinal-fluid circulation and lead to raised intracranial pressure and bilateral papilloedema, without necessarily producing either hydrocephalus or ventricular distortion, especially in cases seen early.

The diagnosis of cysticercosis of the brain rests primarily on the occurrence of epilepsy or other cerebral symptoms, usually, but not invariably, associated with palpable subcutaneous and intramuscular nodules, and a history of residence abroad, particularly in India. It is confirmed by X-ray appearances and by biopsy when possible. The radiographical appearances are extremely variable, depending on the degree of calcification which may have developed—the brain being usually the last place in which calcification begins. Skin-reactions and complement-fixation tests have not so far proved reliable guides. The presence of eosinophilia is suggestive in the earlier stages of infestation, but is inconstant or absent later. One great advantage of a correct diagnosis is the removal of the fear of hereditary transmission and the stigma of idiopathic epilepsy; in soldiers it does away with the difficulty of obtaining a pension, for the infestation may usually be regarded as a consequence of their military service abroad.

The prognosis, though serious, is not, as has commonly been thought, uniformly bad. In a small proportion of cases—5 in Dixon and Smithers's 71 patients—the fits ceased after a variable period. A decompression operation is justifiable and desirable where, as in the present case, there is raised intracranial pressure and papilloedema; and, in the absence of contra-indications, a right subtemporal decompression serves this purpose.


### SUMMARY

A case of *Cysticercus cellulosæ* infestation with focal epilepsy is described, in which there were the unusual features of grossly raised intracranial pressure and rapidly increasing papilloedema, with a normal ventriculogram.

The ventricular fluid was normal; the lumbar-puncture fluid showed a moderate increase of mononuclear cells, protein and globulin, but no polymorphs or eosinophils.

The papilloedema quickly subsided after a right subtemporal decompression which also reduced the frequency of the fits.

Cases of cysticercosis may be more common now that there are large numbers of British troops in the East.

Raised intracranial pressure and papilloedema usually arise from swelling of the brain around degenerating cysts, and are indications for decompression.

Diagnosis is made on the development of epilepsy after residence abroad (especially in India), the presence of subcutaneous nodules, and the X-ray and biopsy findings. Eosinophilia in the blood is of diagnostic value mainly in the earlier stages of the infestation.

The fits sometimes cease spontaneously.


We wish to thank Dr. Neill Hobhouse and Surgeon Captain Macdonald Critchley for putting their clinical notes of the case at our disposal: Dr. Worster-Drought for the specimens from his case; Mr. C. Martin, Mr. R. Egan and Miss M. I. Wilson for preparing the pathological material; and Mr. A. York, assistant radiologist at the hospital, for the radiograms.

### REFERENCES


1. MacArthur, W. P. (1933–34) *Trans. R. Soc. trop. Med.* **27**, 343.
2. Broughton-Alcock, W., Stevenson, W. E. and Worster-Drought, C. (1928) *Brit. med. J.* **2**, 980.
3. Blyth, W. (1941) *Ibid*, **1**, 401; MacArthur, W. P. (1941) *Ibid*, p. 492; leading article, *Ibid*, p. 896.
4. Dixon, H. B. F. and Smithers, D. W. (1934) *Quart. J. Med.* **27**, 603.
5. Gottlieb, B. (1936–37) *Proc. R. Soc. Med.* **30**, 577.
6. Greig, E. D. W. (1937) *Edinb. med. J.* **44**, 522.


## SILICOSIS IN STOURBRIDGE FIRECLAY MINERS

SIDNEY DEANER, M.R.C.S.
CHIEF TUBERCULOSIS OFFICER, WORCESTERSHIRE COUNTY COUNCIL

STOURBRIDGE fireclay miners have not previously been recognised as exposed to a silica risk, and hitherto silicosis has not been observed in such miners. The investigations here recorded have established the diagnosis of silicosis in three of these workers.

Clays are naturally occurring materials composed of silicates, chiefly of aluminium, usually mixed with an indefinite amount of sand and other minerals. The term "fireclay" is commonly applied to the more refractory clays found in the geological formations known as the Coal Measures. Such clays are found as a rule beneath coal seams, so that workers in these collieries often work in both the coal and the fireclay seams. In the Stourbridge area, where firebricks have been manufactured since 1780 or earlier, the fireclay is found in the "Old Mine" seams of the South Staffordshire coal measures. Immediately above the fireclay in geological formation is a shale called Baxton; the rock below is a "mottled clay," a form of crude sandstone. The Baxton has often to be removed to reach the fireclay. In dealing with the fireclay, the miners make their shot holes with machine drills either in the fireclay rock itself or in the mottled clay. When the shot has been fired, buckets of water are poured over the fireclay to allay the dust and moisten the clay before it is picked and collected. In addition to fireclay mining, the workers in this colliery have worked in the coal seams on occasional shifts when required.

The composition of fireclays varies in the same coal-field. The basic constituents are shown in the following analyses which are extracted from Searle's "Refractory Materials."

| | Stourbridge Old Mine | |
|---|---|---|
| | Best selected (%) | Ordinary (%) |
| Silica | 76·5 | 56·6 |
| Alumina | 16·5 | 26·5 |
| Iron oxides | 0·8 | 2·3 |
| Lime | 0·1 | 0·2 |
| Magnesia | trace | 0·3 |
| Potash and soda | 0·7 | 1·7 |

Fireclay in which the contained silica is, as above, in the form of silicates is "pure" fireclay, and as such does not constitute a free silica risk. The fireclay in which the three miners investigated have worked has hitherto been regarded as a pure fireclay. However, a sample of this fireclay was kindly examined under the petrological microscope for me by W. R. Jones, D.Sc., of the Imperial College of Science and Technology, and his report is as follows.

"The sections of the coarser and more coherent lumps of this fireclay show the presence of many grains of quartz, and, in parts, fibres of sericite are fairly numerous. Dried fireclay of this kind could, in my opinion, give rise to harmful dust."

In addition, the following figures show the amounts of total and free silica in Baxton, mottled clay, and samples of dust taken from the floors of the fireclay mine.

| | Total $SiO_2$ | Free $SiO_2$ |
|---|---|---|
| Baxton | 42·6 | 7·2 |
| Mottled clay | 68·2 | 36·1 |
| Dust from floors | 49·6 | 16·2 |

The occupational aspect of the problem may require further investigation, but it is evident that the miners are exposed to dust from fireclay containing quartz grains, and that they are also working with a mottled clay which contains a substantial amount of free silica.

### CASE 1

The first patient has died and the autopsy report is included.

First seen at the tuberculosis dispensary on May 23, 1934, when aged 47. Had been a coalminer for 5 years from 1906–11, and had then worked for 23 years as a "pure" fireclay miner in the same colliery, returning to work in the

coal seams on occasional shifts when required. Complained of chronic cough with sputum for years, dyspnœa on exertion for several months, and pains in right side of chest. Previous attacks of right-sided pleurisy in 1930 and 1931.

Low standard of physique; general condition poor. Chest expansion restricted particularly on right side. Percussion slightly impaired over right apex. Breath sounds poor generally; generalised rhonchi. Clinically condition appeared to be due to chronic bronchitis and emphysema. To eliminate possibility of pulmonary tuberculosis radiogram was taken March 29, but film revealed appearances consistent with early pneumoconiosis. Decided to watch future course, radiological examinations being repeated at intervals. Advised to give up colliery work. Clinically remained much the same until February, 1936, when dyspnœa became worse; physical signs did not alter much apart from increasing impairment of percussion over both upper lobes. Possibility of tuberculous infection was always borne in mind, but numerous sputum tests, as well as guineapig inoculation, always negative. General condition gradually deteriorated, dyspnœa, aggravated by repeated attacks of acute bronchitis, being main symptom. In February, 1941, seven years after ceasing work, he died suddenly.

*Radiological examinations.*—Serial films reveal a striking and progressive fibrosis, and appear to present three stages:

*Stage* 1. In fig. III*a* (plate), taken in 1934, configuration of chest is normal; heart and mediastinum normal; root shadows do not appear enlarged; well-marked increase of striation with mottling throughout lower two-thirds of both lungs, most towards bases. Dr. A. Meiklejohn, who kindly saw the film at the time, stated that "in many ways the picture is consistent with silicosis as seen in certain branches of the pottery industry. There is one striking anomaly—the distribution is chiefly confined to the lower parts of the lungs as in asbestosis, whereas silicosis is usually almost identical in distribution with tubercle."

*Stage* 2. Fig. III*b*, taken in 1935, reveals denser shadows becoming more confluent in mid-zones of both lungs and in right upper lobe. Increasing translucency at bases, indicating emphysematous changes.

*Stage* 3. Fig. III*c*, taken in 1940, shows large dense opacities in mid-zones and right upper lobe. Basal appearances suggest "ballooning."

Despite cessation of exposure to dust, condition was progressive. The evidence of emphysema appears to increase with density of shadows denoting fibrosis. Later films appear to suggest infective type of silicosis, but tuberculosis was conspicuously absent as will be seen later in pathological report.

*Post-mortem report* (Dr. W. Stewart of Worcester).—Body rather emaciated and subcutaneous œdema present in lower limbs. Left lung completely free from chest wall except for very few apical adhesions. Right lung more densely adherent to pleura in upper and middle lobes; adhesions could only be broken down with difficulty. No free fluid. Pericardium normal but external surface showed considerable pigmentation with carbon; myocardium flabby and chambers dilated. Myocardium showed increased fatty infiltration; coronary arteries affected by slight atheromatous changes. No valvular lesion. Liver showed well-marked nutmeg changes; other abdominal organs normal.

*Left lung* weighed 800 g. (normal 570); voluminous and deeply pigmented with carbon. Upper lobe showed considerable thickening of pleura and much old scarring. Large emphysematous bullæ present, largest being size of golf ball. Scattered throughout lung tissue were small fibrous nodules but not so abundant as in typical silicosis. Lower half of lobe coal-black and composed of dense fibroid tissue containing very little air. No discrete nodules of fibrosis made out in this mass; pleural thickening more pronounced over this area. Fairly dense interlobar adhesions. Lower lobe showed similar pleural thickening; emphysema, particularly on diaphragmatic surface, most pronounced, bullæ being size of small Jaffa orange. Upper part of this lobe also showed fibrosed area with similar deep carbon pigmentation. No evidence of tuberculosis. Hilar glands enlarged to size of small beans.

*Right lung* weighed 960 g. (normal 625); appearance similar to left but pleura showed more thickening. Upper lobe voluminous; most of lobe, except about lower third anteriorly, solid mass of old fibrous tissue and very deeply pigmented. Scattered small fibrous nodules also present. Middle lobe fairly densely fused to upper and lower lobes and completely fibrotic. Lower lobe not quite so solid except at upper pole. Emphysema very advanced. In deeper substance of all lobes small bronchiectatic cavities slightly smaller than peas. No macroscopic tuberculosis obvious.

Bronchi showed chronic bronchitis with increased vascularity in walls.

*Histological examination.—Right lung.* Upper lobe: extremely heavy impregnation with dust particles obscured tissue appearances; considerable fibrosis of laminated whorled type enmeshing dust particles, lung alveoli having completely disappeared in fibrous mass; arterial walls considerably thickened. Lower lobe: patchy areas of deep pigmentation; lung alveoli distended and walls thinned; considerable engorgement of vessels; silicotic and anthracotic fibrosis present. *Left lung.* Upper lobe: deep pigmentation, patchy in type and somewhat intensified around blood-vessels; considerable pigment in lymphatic channels; silicotic fibrotic nodules present. Lower lobe: in solid portion appearances similar to those in other lobes, but silicotic fibrosis more definite.

**The pulmonary lesion is, therefore, one of chronic fibrosis, in the production of which both silica and coal dust appear to have played a part; it thus conforms to the type of pulmonary fibrosis described as silico-anthracosis.**

*Chemical analysis* of portions of dried lung was made as a matter of interest.

| | Total $SiO_2$ (%) |
|---|---|
| Right upper lobe .. .. .. | 4·9 |
| Right lower lobe .. .. .. | 3·9 |
| Left upper lobe .. .. .. | 2·2 |
| Left lower lobe .. .. .. | 2·2 |

**The silica content of normal lungs is up to 0·2% on the weight of dried lung. The lungs therefore contained increased amount of silica in the tissues. Stewart (1933), however, found that an abnormal silica content in lung tissue cannot be taken as corroborative evidence of silicosis. King and Belt (1940) also found no evidence of a direct association between the concentration of silica and the degree of fibrosis, but pointed out that in silicotic lungs silica was always in excess of 0·2%.**

**The two other cases to be described are still alive but very much incapacitated.** (See cases 2 and 3 on p. 419.)

## LEGENDS TO ILLUSTRATIVE PLATE

### DR. CARNEGIE DICKSON AND CAPTAIN WILLIS

FIG. I—Radiograms of soft tissues, showing calcified cysticerci, mostly in muscles. (*a*) Near left elbow; (*b*) at upper and outer aspect of left thigh. Natural size.

FIG. IV—Paraffin section through two adjacent specimens of the bladder-worms of *Tænia solium*, the pork-tapeworm, from the frontal cortex (see fig. III) of Dr. Worster-Drought's case, a soldier home from India who died at the age of 28 after suffering from epileptiform fits and cysticercosis of the left eye for 6 years. The upper specimen is a well-preserved and "healthy" or "symbiotic" scolex, lying within the invagination of the wall of the little bladder which in turn has been derived from the main caudal vesicle or bladder from which the larva gets its name "cysticercus." The lower specimen in the figure is an example of a dead and disintegrating parasite showing accumulation of fluid in the cyst and an inflammatory reaction at its periphery—i.e., the stage at which it becomes more irritative and dangerous to its host. Mallory's connective-tissue stain × 12.

FIG. V—Higher magnifications of the upper cyst illustrated in fig. IV, showing details of the scolex and its caudal vesicle. In the section of the anterior end of the scolex, passing obliquely through the muscular rostellum, the double circlet of hooklets and two of the four suckers are seen. Mallory's connective-tissue stain (*a*) × 20; (*b*) × 60.

### DR. DEANER

FIG. I—Case 2, showing lesion mainly in mid-zone.

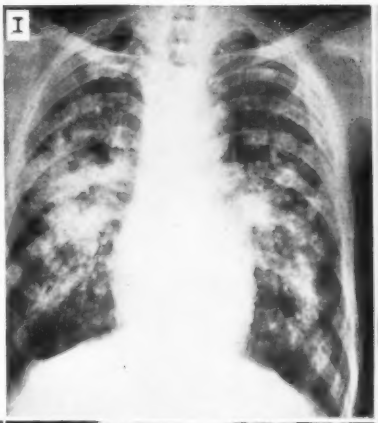
FIG. II—Case 3, showing dense opacities in right upper zone, irregular opacity in right mid-zone, and opacities in left mid-zone.

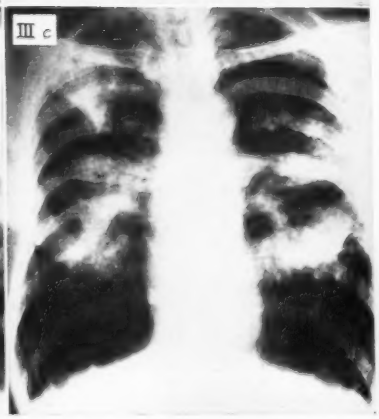
FIG. III—Case 1, showing progressive fibrosis in mid-zones and right upper zone. (*a*) 1934; (*b*) 1935; (*c*) 1940.

## DR. CARNEGIE DICKSON AND CAPTAIN WILLIS: CYSTICERCOSIS OF THE BRAIN

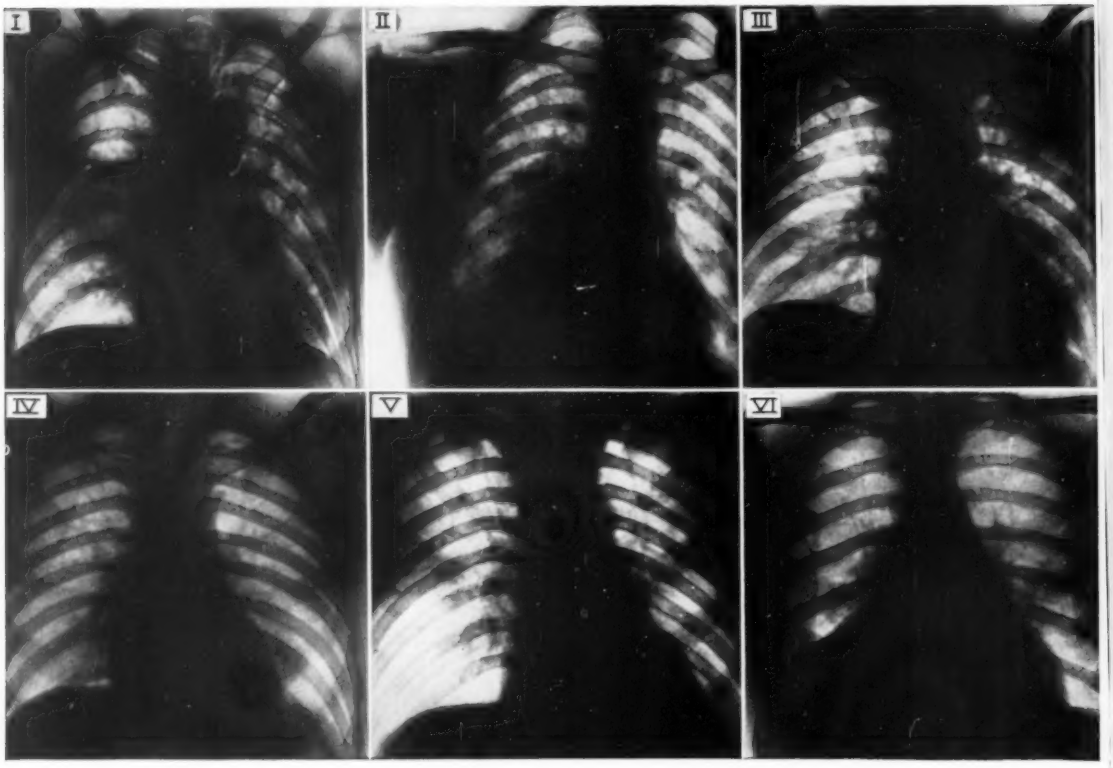
*Legends to the illustrations are given on the opposite page*

## DR. DEANER: SILICOSIS IN STOURBRIDGE

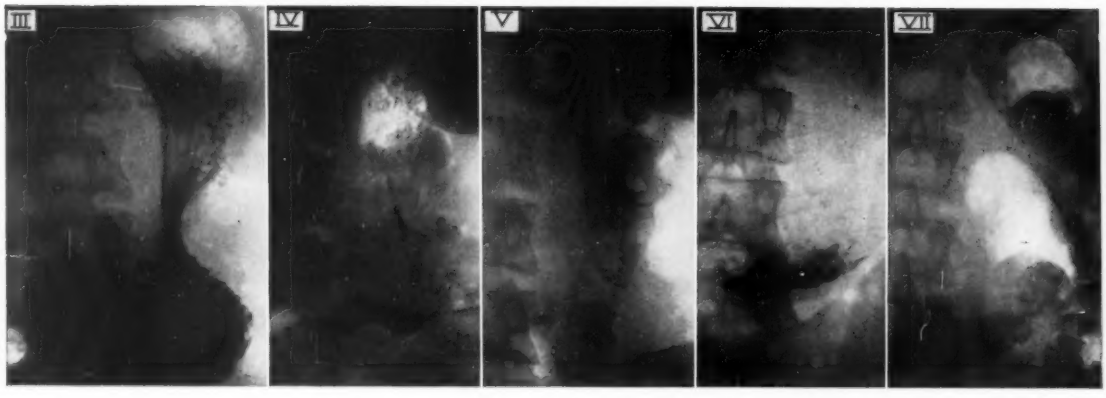




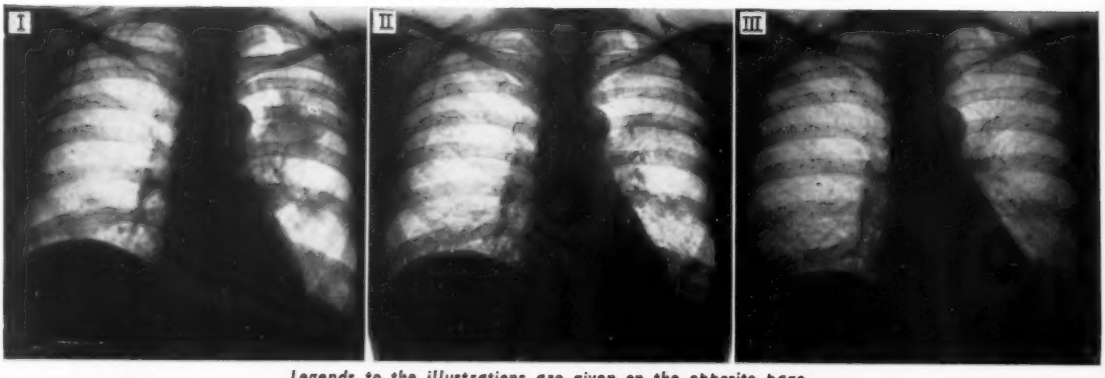
## DR. O'REILLY AND DR. GLOYNE: BLAST INJURY OF THE LUNGS




## DR. ALSTEAD: BISMUTH CARBONATE IN GASTRIC DISEASE




## DR. CLARK: A CASE OF SYPHILIS OF THE LUNGS




*Legends to the illustrations are given on the opposite page*

CASE 2

Man of 56 who has been a clayminer, in same colliery as first case, for past 36 years. Has also been required to work at coal on occasional shifts. Chronic cough with sputum for some years. Attacks of dry pleurisy on right side of chest in 1937 and in January, 1939. Increasing dyspnœa on exertion for past 3 years, with gradual loss of weight during the past year. Gave up work on July 19, 1940.

Low standard of physique and general condition poor. Chest movement restricted, particularly on right side. Percussion note impaired over both apices, but very few adventitious sounds heard. Had been admitted to sanatorium as case of pulmonary tuberculosis. Sputum tests, culture, and guineapig inoculation all negative for tuberculosis.

*Radiological examination* (fig. I) shows slight tracheal deviation to right. Heart normal. Root shadows not enlarged. Distribution of lesion definitely in mid-zones. On right side dense irregular opacity, rather soft in appearance, tending to spread slightly into upper and lower zones; clear area near root suggests patch of emphysema rather than breaking down. On left small irregular opacities with mottling in mid-zone, not so confluent as on right.

CASE 3

Man of 63, brother of case 2. Worked in same mine as two previous cases as clayminer for 45 years. Conditions of work similar. Cough with sputum for past 3–5 years, with increasing dyspnœa and loss of weight. Early in 1940 had been off work because of pleurisy in right side of chest. Ceased work finally on July 10, 1940, because of further pain on that side and extreme weakness.

Poor physique and general condition very poor. Restricted chest movement. Percussion note impaired over both upper lobes. Crepitations over both apices, right more than left; diminished air-entry at bases. So far, sputum tests negative for tubercle bacilli.

*Radiological examination* (fig. II).—Ribs on right side more sloping than left. Tracheal deviation to right. Mediastinal shadow widened; right side of heart enlarged. Root shadows not enlarged. On right dense opacity in the upper zone and irregular opacity in mid-zone; emphysematous changes at base. On left opacities in mid-zone, with mottling towards base.

Cases 2 and 3 have since applied to the Silicosis Medical Board and have received certificates of disablement by reason of silicosis.

## LEGENDS TO ILLUSTRATIVE PLATE

DR. O'REILLY AND DR. GLOYNE

FIG. I—Case 2, within 12 hours of injury. Heavy mottling of whole left lung field and right mid-zone.

FIG. II—Case 3, about 48 hours after injury. Heavy mottling of both lung fields. Consolidation at right base.

FIG. III—Case 4, about 30 hours after injury. Heavy mottling of left lung field; less on right.

FIG. IV—Case 5, small pneumothorax at left base with mottling of left lung field.

FIG. V—Case 6, 24 hours after injury. Characteristic mottling of both lung fields, but less than in previous cases.

FIG. VI—Case 7, 54 hours after injury. Collapse of right base. Subsequent films showed re-expansion and resolution.

DR. ALSTEAD

FIG. III—Immediately after barium meal, showing penetrating ulcer on lesser curvature.

FIG. IV—Taken 2 min. after gr. 30 of bismuth carbonate. Pool in most dependent part of stomach; trace adhering to mucosa of body of stomach.

FIG. V—Taken 27 min. after meal of toast and milk and 2 min. after taking gr. 30 of bismuth carbonate. Showing dispersal of bismuth carbonate among stomach contents; bulk of salt still in middle of body of stomach.

FIG. VI—Taken 1½ hours later. Stomach emptying; remaining bismuth carbonate has collected at most dependent part of stomach; none elsewhere.

FIG. VII—Residue of bismuth carbonate after 28 hours. Previous barium meal had shown normal emptying time.

DR. CLARK

FIG. I—Radiogram on first attendance (March 2, 1939), showing large opaque area in left upper zone, with smaller opacity near root.

FIG. II—Radiogram on April 20, 1939, showing considerable absorption of opacities.

FIG. III—Radiogram on Jan. 20, 1941, showing still further improvement.

DIAGNOSIS

The International Conference on Silicosis in 1938 defined the disease as "a pathological condition of the lungs due to the inhalation of silicon dioxide," the silica being in a free or uncombined state. During life, the diagnosis depends essentially on:

1. An occupational history revealing sufficient exposure to a silica risk.
2. Radiological findings.
3. Clinical examination.

In an industry presenting a well-established occupational silica risk, where in a large number of cases careful correlation has already been made between the radiological appearances and the pathological findings, the diagnosis in a given case is relatively easy when clinical and X-ray findings are suggestive. Where, however, a silica risk has yet to be proved, during life only a tentative diagnosis is possible even with extensive radiological experience of silicosis in other industries. This was the position when the first case in this series was seen in 1934. The autopsy and histological findings described above now establish the condition as silico-anthracosis, and it is therefore now possible to review the criteria of diagnosis in these cases.

*Occupational history, and exposure to silica risk.*—That the rock at which these men have worked can no longer be regarded as pure fireclay has been shown by the demonstration of the presence of quartz grains; the adjacent rocks also contain free silica. But it is difficult to account for the intense pigmentation with carbon as seen post mortem, for there does not seem to be sufficient exposure to coal dust. It has been suggested by Cummins and Sladden (1930) that anthracosis requires for its development preceding damage of the lung by silica. Had the men worked for an appreciable time in the coalmine it might be suggested that the primary risk causing silico-anthracosis lay there, but there appears no doubt that most of their time has been spent at the fireclay. This aspect of the occupational problem requires further investigation. Our main concern, however, has been to show that the men are exposed to a free silica risk, a criterion necessary for the diagnosis of silicosis.

2. *Radiological findings.*—The series of films in case 1 illustrate the progression from reticulo-mottling to coalescence and final dense fibrosis. The initial basal distribution is unusual; it suggests the predominance of interstitial fibrosis associated with silicosis due to mixed dusts as against the nodulation seen in pure silica inhalation. The films of the two other cases represent the advancing stages of coalescence; the appearances are not so well defined as in the first case, and the infective element strongly suggests itself. The distribution is, characteristically, mid-zone. It is to be noted that the root shadows are not abnormally enlarged.

3. *Clinical history and examination.*—Poor physique and cough with sputum were noted in each case, but dyspnœa on exertion was the main symptom. Pain was also a well-marked feature, probably associated with the formation of adhesions. The loss of weight in the last two cases may arise from an infective element, especially as they are brothers, although so far tubercle bacilli have not been found in the sputum. Physical signs in the first case suggested chronic bronchitis and emphysema; in the second case they were indefinite; in the third they were suggestive of tuberculosis. It will be seen, therefore, that the clinical history and examination is typical of silicosis, but the diagnosis cannot be based on clinical examination alone, although this is essential in assessing incapacity.

* * *

It seems reasonable to suggest that these clayminers should benefit from the provisions made for the compensation of silicosis. It is possible that they are already covered by the Various Industries (Silicosis) Scheme 1931,

especially having regard to a decision in the House of Lords (1935), when workers breaking down shale, which though not silica rock in itself, contained small lenticles of quartz, were considered to be in an occupation scheduled under that act.

SUMMARY

Stourbridge clayminers are exposed to dust containing free silica.

A case is described in which the autopsy reveals that the pathological condition is silico-anthracosis.

Two other cases are described with similar occupational and medical histories and radiological appearances; these are therefore presumed to be suffering from the same pathological condition.

These clayminers should be eligible for compensation under the provisions made for cases of silicosis.

My thanks are due to Dr. A. Meiklejohn for standing godfather to this paper; to Dr. W. Stewart and Dr. Leslie Bold for their coöperation; to Mr. H. E. Monk, F.I.C., and Mr. E. R. Nind, F.I.C., for their work on the chemical analysis, and the colliery authorities for their courtesy and help; finally, to Mr. F. Fitzhugh for his help in the preparation of this paper.

REFERENCES

Cummins, S. L. and Sladden, A. F. (1930) *J. Path. Bact.* **33**, 1095.
Fowweather, F. S. (1939) *Analyst*, **64**, 779.
House of Lords (1935) Morgan *v.* Amalgamated Anthracite Collieries Ltd. Hutchings *v.* same. Butterworth's Workmen's Compensation Cases, London, vol. XXVIII, 358.
King, E. J. and Belt, T. H. *J. Path. Bact.* **51**, 269.
Searle, A. B. (1924) Refractory Materials, London.
Stewart, W. (1933) *Bgham med. Rev.* **8**, 114.

## A CASE OF SYPHILIS OF THE LUNGS

ARNOLD CLARK, M.D. LOND., M.R.C.P.

TUBERCULOSIS OFFICER FOR DORSET; CONSULTING PHYSICIAN, PORTWEY (E.M.S.) HOSPITAL, WEYMOUTH

THE scarcity of recorded cases of syphilis of the lungs may partly be due to the infrequency with which it is recognised and the belief that antemortem diagnosis cannot be established.[1] The object of publishing this case is to show that a diagnosis can be arrived at during the patient's life and to help in establishing clinical data on which a diagnosis can be made.

A widow, aged 54, was asked to attend a clinic under the tuberculosis scheme because she had been notified as suffering from "tuberculous disease of the malar bone." Her occupation was domestic duties. Apart from an intractable ulcer on her left leg in 1927 she had always been healthy until 1936, when she began to suffer from cough, with small amounts of sputum streaked from time to time, lassitude and dyspnœa. Dyspnœa had only become pronounced during the previous few months, when her duties had become too much for her. Has one grown-up son. No history of miscarriage. Her husband died in 1919 at the age of 37 from "growth on the brain." First sought medical advice for a swelling over the left temporo-frontal region which developed in 1937 and for which she received treatment from her doctor for 8 months. The swelling was excised at the local hospital in January, 1938, but a chronic discharge persisted until December, 1938. About this time she developed a similar swelling over the left malar bone which was incised at the same hospital in November, 1938.

At her first attendance at the clinic on March 2, 1939, the lower of the two incisions was weeping slightly while the upper had healed completely. Weight 8 st. 5¼ lb.; best known weight 10 st. The chest was symmetrical. Some restricted movement of the left upper half where the percussion note and air entry were impaired but no adventitious sounds were detected. Apex-beat in normal position. Heart-sounds normal. B.P. 145/95 mm. Hg. Pulse-rate 70 per min., regular. Mentality and memory good. Pupils equal and reacted to light and accommodation. No objective sensory changes. Complained of pain over left femur not unlike tabetic pains. No rombergism. Tendon reflexes normal. Healed ulcer with tissue-paper appearance over upper end of left fibula. No tubercle bacilli found in sputum (no further examinations made because cough had gone by next attendance). Blood Wassermann and Kahn reactions ++. Radiogram of chest on March 2 (fig. I, plate): arch of aorta slightly prominent and contains a calcified plaque; left upper zone contains a large opaque area irregular in outline from which radiate processes connecting it with a similar but smaller opacity in lower zone lying near root.

For various reasons only ambulatory treatment could be undertaken. Antisyphilitic treatment was instituted immediately the true cause of the lesion was suspected. She attended a local treatment centre—and still continues to do so, for her Wassermann and Kahn reactions are still positive. She was asked to attend for X-ray examination fortnightly but failed to do so, and her second attendance was not until April 20, 1939, when the film (fig. II) already showed considerable absorption of the opacities originally noted. Her symptoms, too, were much improved; she could do a day's work and walk upstairs without undue dyspnœa; her cough had disappeared; the sinus over her left malar bone had healed. Further radiograms showed progressive improvement. At her last attendance on Jan. 20, 1941, she was in "better health than ever" (fig. III). Despite "winter colds" there is no persistent cough. Weight 8 st. 10½ lb.

This appears to be a case of the gummatous form of lung syphilis.[2] The criteria on which the diagnosis is based are:

(1) Length of history.
(2) Positive serological findings.
(3) Absence of tubercle bacilli in sputum.
(4) Prompt relief of symptoms and progressive, rapid and maintained improvement in X-ray appearances following antisyphilitic treatment.
(5) Presence of syphilitic lesions elsewhere.

I should like to thank Dr. T. W. Stallybrass, the county M.O.H., for permission to publish this case, and Dr. T. V. Cooper, the county pathologist, for the laboratory investigations.

1. Karshner, R. G. and Karshner, C. F. Syphilis of the Lung. *Ann. Med. Hagerstown*, 1920, **1**, 371.
2. Shanks, S. C., Kerley, P. and Twining, E. W. Text-book of X-Ray Diagnosis, London, 1938. Vol. I, p. 269.

## ACTION OF BISMUTH CARBONATE IN GASTRIC DISEASE

STANLEY ALSTEAD, M.D. LPOOL., M.R.C.P.

ROBERT POLLOK LECTURER IN PHARMACOLOGY AND THERAPEUTICS, UNIVERSITY OF GLASGOW; ASSISTANT VISITING PHYSICIAN, STOBHILL HOSPITAL, GLASGOW

THE gastric antacids and sedatives constitute an important group of therapeutic agents, and it is comparatively easy to confirm their effectiveness. In certain kinds of gastroduodenal disease temporary relief of pain consistently follows the administration of an antacid in a high proportion of cases. The action of these compounds on the pH of the gastric contents is also demonstrable by observations made in the course of fractional test-meals.

Bismuth carbonate and bismuth subnitrate are included in this group of drugs. The employment of these basic salts of bismuth dates from the use of the subnitrate by Odier in 1803. It is noteworthy, however, that he used this salt in doses of only one grain and always prescribed with it magnesia (gr. 10) and sugar (gr. 10).* Odier thought this compound powder an infallible remedy for gripe, and since then bismuth preparations have enjoyed a vogue in the treatment of gastroduodenal lesions. MacKenna (1931), in a paper on the history of bismuth, mentions that in 1852 Chambers in England, and Kussmaul in Germany, advocated bismuth salts in the treatment of gastric ulcer; Kussmaul recommended the subnitrate in doses of 10–20 grammes daily. In recent years bismuth subnitrate has fallen into disrepute, after the publication of a number of cases of nitrite poisoning attributed to the reduction of the nitrate by intestinal bacteria. Bismuth carbonate, on the other hand, is still widely used in the treatment of gastroduodenal disease, especially in cases of peptic ulcer and gastritis. According to standard works on pharmacology (Cushny 1941, Poulsson 1940, Dilling 1940) this insoluble salt acts mainly by coating the gastroduodenal mucosa, thus behaving as a protective in much the same way as a

* In the third edition of Odier's Manual, published in 1821, the author is less conservative and recommends the "white oxide of bismuth" in doses of gr. 6–12 four times daily. He also states that he discovered the remedy in 1786.

dusting powder soothes an irritated skin. Hurst (1929), however, describing a series of radiological observations made by his collaborator Dr. P. J. Briggs, states that "half an ounce of bismuth oxycarbonate taken in suspension on an empty stomach does not as a rule adhere to

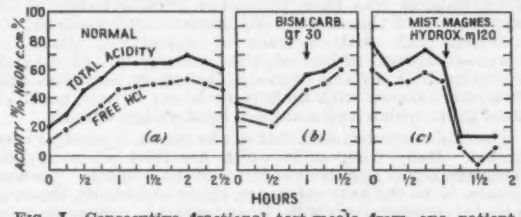



FIG. I—Consecutive fractional test-meals from one patient. (*a*) Normal record. (*b*) With bismuth carbonate 30 gr. acidity continues to rise. (*c*) With mist. magnes. hydrox. ɱ 120 there is a large immediate fall in acidity.

the ulcer crater surface of even a large gastric or duodenal ulcer." Bismuth carbonate is also reputed to have an astringent action on the stomach (Adams 1939), and to act as a weak antacid (Dilling 1940, Whitla 1933). The antacid value of bismuth carbonate has been carefully studied by Freezer, Gibson and Matthews (1928). They have shown that when 0·3% hydrochloric acid (pH 1) is mixed with an excess of bismuth carbonate the solution never attains neutrality, but remains persistently acid (pH 4); and no further reaction takes place after one minute. They also tabulate their conclusions regarding the relative efficiency of the "alkalis" expressed as a comparison with sodium bicarbonate, which is assigned an arbitrary value of 100; the figures for magnesium oxide, calcium carbonate and bismuth carbonate are 317, 20 and zero. Again, Clark (1940) points out that the acidity of the gastric juice secreted by a normal person in 24 hours corresponds to about 5 g. of pure hydrochloric acid; and whereas this is neutralised by 3 g. (gr. 45) of magnesia, as much as 136 g. (gr. 2000) of bismuth carbonate would be required.

## PRESENT INVESTIGATION

The object of this investigation was to determine the value of bismuth carbonate in relieving the pain of gastroduodenal disease, and to examine the views commonly accepted as to the fate of this salt in the stomach.

*Antacid action.*—The in-vitro experiments of Freezer, Gibson and Matthews referred to show that, although the addition of bismuth carbonate to weak hydrochloric acid raises the pH the reaction of the mixture never approaches neutrality. My own observations were made using open test-tubes instead of the closed apparatus described by these workers, but the results were substantially the same. A quantity of bismuth carbonate (B.P.) weighing 1·5 g. was shaken up in a wide tube with 15 c.cm. of distilled water, and 15 c.cm of N/10 hydrochloric acid (pH 1) was then added. The mixture was filtered and the pH of the filtrate was found to be in the region of 3·3. The same result was obtained when similar mixtures had been allowed to stand for intervals ranging from 1 to 10 minutes. Hydrogen-ion concentration was determined by means of chemical indicators and the Lovibond comparator, and the figures are regarded as being only approximate. These rough estimations of the neutralising power of bismuth carbonate on decinormal HCl were carried out merely as a preliminary to similar observations on gastric juice. It was found that the addition of an excess of bismuth carbonate to gastric juice in vitro produced only slight changes in acidity, as is shown by the following example:—

| | Decinormal HCl c.cm. % Free HCl | Total acidity | pH |
|---|---|---|---|
| Before addition of bism. carb. .. .. .. | 40 .. | 55 .. | 2 |
| After excess bism. carb. | 32 .. | 50 .. | 2·1 |

The feebleness of the antacid action on gastric juice is probably partly due to the buffering effect of muco-protein.

The third method of investigation consisted in making observations during fractional test-meals. In any individual, however, day to day variations in fractional test-meal results are so considerable that experiments of this type necessarily lack controls that are completely satisfactory. The nearest approach to obtaining adequate control readings consists in using the first three or four of a series prior to the administration of the drug under investigation. Although this method is imperfect its value is increased when applied to a drug whose potentialities are already known from in-vitro experiments; and the negative results from bismuth carbonate are more convincing when compared with the effect of the powerful antacid magnesium hydroxide (fig. I). In all, 9 patients were investigated by means of fractional test-meals, using half-drachm doses of bismuth carbonate. It was found that the acidity was unchanged or continued to increase in 7. In 2 who had very low acidity (corresponding to 10 and 20 c.cm. N/10 NaOH% respectively) the curves fell to zero after the administration of the salt; that these falls were spontaneous rather than the effect of the bismuth carbonate is suggested by the fact that the addition of an excess of bismuth carbonate to gastric juice in vitro never reduced the acidity by more than 10 c.cm. N/10 HCl%.

The effect of administering a single large dose of bismuth carbonate was also studied. Two fractional test-meals were performed on a healthy medical student. During the first he received an average dose (gr. 15). It will be seen (fig. II*a*) that the fall in the gastric acidity was negligible; indeed the curves reveal that spontaneous alterations were greater than the change attributed to the action of the bismuth carbonate. On another occasion he was persuaded to take a very large dose (gr. 210). The effect on the gastric acidity was more impressive (fig. II*b*) but it lasted only half an hour. My colleague Mr. J. B. Pettigrew estimated the hydrogen-ion concentration of the samples electrometrically and found that the change was comparatively small (pH 1·67 to pH 2·16). The bismuth carbonate and bismuth oxychloride which

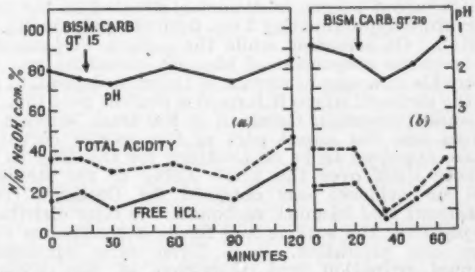



FIG. II—Consecutive fractional test-meals from one patient showing effect of (*a*) gr. 15 and (*b*) gr. 210 of bismuth carbonate on gastric acidity.

were present in all the samples of gastric juice appeared to have caused the mucus to form curd-like masses.

*Astringent action.*—Bismuth carbonate can act as an astringent in the stomach only if it is sufficiently soluble in the gastric juice. Dissolved bismuth can be detected by adding to it a freshly prepared solution of stannous chloride in strong caustic soda; the bismuth salt is immediately reduced and is precipitated as metallic bismuth, which gives colours ranging from jet black to light brown according to the quantity of the metal present. The test is sufficiently sensitive to detect 1 part of bismuth in 400,000. By this means it was found that after mixing 0·3% hydrochloric acid with an excess of bismuth carbonate the amount of bismuth in the filtrate was not more than 1 part in 160,000. To test the astringency of this concentration of bismuth, a sample of the filtrate was added to an aqueous solution of egg-albumin. No coagulum was produced, indicating that the astringent effect of the dissolved bismuth was negligible. The question arises as to whether bismuth carbonate is soluble in the organic acids of the gastric juice. It has been shown that lactic acid is formed in the stomach only when free hydrochloric acid is absent or diminished—less than 20 c.cm. N/10%. The solubility of bismuth carbonate in N/10 lactic acid was estimated. It was found to be approximately 1 part in 300,000. Here again, no astringent action was perceptible when measured by the effect of the solution upon

egg-albumin. As a control, the same solution of egg-albumin was used to demonstrate the astringency of dilute solutions of tannic acid (B.P.). Coagulation of the protein was readily produced by a 0·05% solution of tannic acid.

The solubility of bismuth carbonate in gastric juice was investigated. Samples of juice were obtained from 4 patients; the total acidity ranged from 10 c.cm. to 56 c.cm. N/10% and the free hydrochloric acid from zero to 48 c.cm. N/10%. The samples were mixed with an excess of bismuth carbonate and kept at body-temperature for two hours. Some of the juice was then decanted and tested for dissolved bismuth. The stannous-chloride test gave a negative result in all cases.

The conclusion that only a minute trace of bismuth dissolves in weak hydrochloric acid is not incompatible with the observation that bismuth carbonate can increase the pH of the solution. In the presence of hydrochloric acid bismuth carbonate forms bismuth oxychloride, and thus, within certain limits, it diminishes the hydrogen-ion concentration. The following test was done to demonstrate this action.

An excess of bismuth carbonate was added to about 50 c.cm. of hydrochloric acid which had a pH of 0·7. The mixture was shaken and set aside for a few minutes. It was then filtered and the filtrate was found to have a pH of 1·1. The residue was washed with distilled water until free of hydrochloric acid—that is, until the washings failed to give a precipitate with silver nitrate—and it was then dissolved in nitric acid (B.P.). About 5 c.cm. of the nitric-acid filtrate was tested for chloride by means of silver nitrate. A heavy white precipitate formed, proving that abundant chloride was now present in solution. As a "blank" bismuth carbonate was dissolved in strong nitric acid; this solution gave no precipitate with silver nitrate.

*Radiological findings.*—Seventeen observations were made on 12 patients, 2 of whom had large penetrating ulcers (about 1·5 cm. in diameter) situated on the lesser curvature approximately 7 cm. from the pylorus (fig. III, plate). On screening while the patient was standing, the aqueous suspension of bismuth carbonate was seen to trickle in a narrow stream to the most dependent part of the stomach where it formed a shallow pool (fig. IV). A small proportion remained in the track between the cardia and the lowest part of the greater curvature. There appeared to be no tendency for the drug to distribute itself over the whole lining of the stomach; and no evidence was obtained for Cushny's (1941) statement that bismuth carbonate "is later distributed evenly over the surface and forms a continuous sheet over any ulceration. . . ." Even after appropriate manual palpation and alteration of the patient's posture the distribution of the bismuth carbonate was not permanently altered; with the resumption of the erect posture the pool immediately reappeared in the original position. Repeated efforts to fill the large ulcer craters failed even after giving gr. 90 of the drug.

Nine of the patients were investigated to discover the effect of taking a meal about half an hour after a dose of bismuth carbonate. They received 2 g. (gr. 30) of the salt about half an hour before breakfast and a radiological examination was made 2 hours later. In 5 of this series there was no sign of the drug; apparently it had mixed with the foodstuff and was carried through the pylorus during the early stages of emptying of the stomach. In the remaining 4 patients a variable amount of the drug had been retained at 2 hours; it was invariably confined to the prepyloric region of the greater curvature as in fig. VI. Complete disappearance of the salt was accelerated by the taking of more food. In one patient, however, it persisted for at least 28 hours although five meals had been taken during this time (fig. VII). When there was food in the stomach at the time of administration of the drug, the suspension of bismuth carbonate was seen to follow the usual course, but the stream was soon broken up into several smaller ones by the food masses, and the bulk of the salt accumulated about the middle of the body of the stomach. Thereafter the drug gradually dispersed and became intimately mixed with the gastric contents (fig. V).

*Therapeutic tests.*—Observations were made on 21 male patients admitted to a medical ward of Stobhill Hospital on account of abdominal pain thought to be associated with abnormalities of the stomach or duodenum. After the usual clinical examination the patients were investigated radiographically, a fractional test-meal was done, and the stools were tested for occult blood. The patients were given the ordinary ward diet. Each patient was then presented with a batch of 18 powders; 6 of these contained bismuth carbonate gr. 30, coloured pink with a trace of azorubrum (B.P.C.); 6 were composed of lactose, the quantity (gr. 40) having a similar bulk to the bismuth carbonate powders, and these were tinted with methylene-blue; 6 were made of dried milk, which had a natural light yellow colour.

The choice of substances that can be used as controls is very limited. Many compounds which are inert when applied externally act as adsorbent antacids in the stomach. Lactose appears to be the only substance, easily obtainable, which is entirely satisfactory. Milk is an antacid, neutralising its own volume of gastric juice (Freezer et al. 1928), and powdered milk must be regarded as an antacid when adequate quantities are used. In doses of about gr. 30, however, this effect is hardly likely to be appreciable. This view is supported by the results of the present investigation, and milk powder in small doses was regarded as an inert substance and was accordingly used as an additional control.

The patient was directed to take the powders in any order and to decide in the course of a week or ten days which of them, if any, gave relief from pain. It was emphasised that he must not take a powder unless he had pain; and in the event of a powder failing to give relief he was to wait for half an hour before trying one of the others. Effects other than the action on pain were ignored. The composition of the powders was not disclosed to the patients, or to the nursing staff with the exception of the ward-sister; the powders were referred to only by colour. The group of patients was not selected except in so far as it was found necessary to abandon the investigation in a few patients who were not sufficiently intelligent to coöperate satisfactorily. No precautions were taken to prevent conversation between patients who were receiving treatment with the powders at the same time. The patients' descriptions of the effects of the powders were roughly classified as (*a*) no relief; (*b*) doubtful; (*c*) definite relief; (*d*) pronounced relief. The last two were considered to be significant. In 16 patients there was objective evidence of disease: duodenal ulcer or scarring 10; gastric ulcer 2; gastritis 1; gastric spasm 1; simple hyperchlorhydria 2. In 5 patients no signs of disease were discovered. The answers are summarised in the following table; several of the patients reported relief from more than one powder, and therefore the number of answers exceeds the number of patients.

EFFECT ON GASTRODUODENAL PAIN OF BISMUTH CARBONATE AND CONTROL POWDERS

| — | Whole series | Disease proved | Disease not proved |
|---|---|---|---|
| Relief from— | | | |
| Pink powder (bism. carb.) .. | 6 | 6 | 0 |
| Blue powder (lactose) .. | 8 | 6 | 2 |
| Yellow powder (dried milk) .. | 6 | 5 | 1 |
| Unrelieved by any of powders | 5 | 3 | 2 |

Among the 6 patients who appeared to get relief from the bismuth carbonate, 4 were also relieved by taking lactose or dried milk, and 2 experienced no relief from either of these pharmacologically inert powders. None of the patients said that the three powders gave equal relief.

Eight of the patients, after completing the course of treatment with the coloured powders, were given a similar opportunity to express an opinion on the effectiveness of a "white powder" which was magnesium oxide given in doses of gr. 6 (Mist. magnes. hydrox. ℥ 120). The object of using this substance was to determine whether the pains were amenable to treatment by a drug which is known to have a powerful antacid action. Six of these reported immediate relief from pain, and the benefit far exceeded any that had been obtained from the coloured powders. It is noteworthy that lesions of the stomach or duodenum had been demonstrated in all of these 6 patients; in the other 2 patients no disease had been

discovered, and neither of them benefited from the magnesium hydroxide.

These results were examined statistically by Dr. Richard A. Robb of the mathematics department in the University of Glasgow, and his findings may be summarised as follows.

The effects of the inert powders (lactose and dried milk) is shown by contingency tables where the 21 patients are classified according as they have or have not disease, and according as they do or do not get relief from the powders. As is to be expected, the classifications are independent, using the $\chi^2$ test; that is to say, these inert powders gave as much relief to patients with disease as to those with disease not proved. The same analysis when applied to the results obtained from bismuth carbonate again shows that the classifications are independent—the response of the patients was the same as when the inert powders were used.

It was found possible to distinguish between the degrees of relief obtained from the treatment, so that further analyses of the data were made. Again the figures indicate that there was no difference in the response of the patients to the three powders—bismuth carbonate, lactose and dried milk. If the 5 patients with no evidence of disease are excluded from the series and the analysis confined to those known to be suffering from gastro-duodenal disease, the results are the same.

### DISCUSSION

The investigations provide no evidence in favour of the view that bismuth carbonate in therapeutic doses is a reliable means of protecting the gastric mucosa. After administration by mouth, the salt collects in the most dependent part of the stomach and there is a tendency for it to adhere to the mucous membrane in a relatively small area in the prepyloric region; but the ulcer-bearing area of the stomach is rarely affected.

Bismuth carbonate may exert an astringent action on the empty stomach, but the investigations show that even under favourable conditions this must be very slight; and in practice it must be rendered negligible by the combination of the minute amount of bismuth in solution with the mucoprotein of the gastric juice. It is clear that when a gastric astringent is required other drugs offer a much more reliable method of treatment—e.g., tannic acid in the form of glycerin of tannic acid (B.P.).

Previous workers have shown that the chemical properties of bismuth carbonate make it an unsatisfactory antacid for clinical purposes, and this conclusion is confirmed. The antacid effect following therapeutic doses of bismuth carbonate is seen to be trivial or entirely absent. Although very large doses produce appreciable changes in gastric acidity, even these are transient, and the side effects of such large quantities, especially constipation, cannot be disregarded. There seems therefore to be little justification for the view that bismuth carbonate is a valuable adjuvant to powerful antacids such as magnesia. The negative results obtained in test-meals are in keeping with the conclusions drawn from the therapeutic trials in patients suffering from gastro-duodenal disease, when it was found that bismuth carbonate was no more valuable than powdered milk or lactose in relieving pain. The findings as a whole support the view expressed by Hurst (1929): "It seems very improbable that the small dose of bismuth [carbonate] given with sodium bicarbonate in the usual alkaline mixtures, powders and tablets can exert an action of any kind in the stomach. Its use should therefore be discouraged, as it has the disadvantage of making the stools black so that the immediate recognition of slight melæna by the patient becomes impossible."

### SUMMARY

The action of bismuth carbonate as an antacid was investigated in vitro, and also by fractional test-meals in healthy and ulcer subjects. Therapeutic doses were found to have only a negligible effect on gastric acidity.

Hydrochloric acid or lactic acid of the strengths found in the stomach dissolve only a trace of bismuth carbonate. Such solutions were found to have no astringent action on egg albumin.

In 12 patients who were screened after taking doses of bismuth carbonate the drug formed a pool at the most dependent part of the stomach, and showed no tendency to distribute itself over the lining of the stomach or to fill the crater of an ulcer when one was present.

Three powders consisting of bismuth carbonate, lactose and dried milk respectively were given to 21 patients complaining of abdominal pain thought to be due to abnormalities of the stomach or duodenum, and they were asked to say which powder relieved their pain. No significant difference was found in the pain-relieving effects of the three powders. Six of the patients with demonstrable disease of the stomach were then given magnesium hydroxide; all of them reported much greater relief than from any of the powders.

It is concluded that in therapeutic doses bismuth carbonate has a negligible effect as an antacid or as an astringent dressing for the gastric mucosa, and that it is of no value for the relief of pain in gastroduodenal disease.

I desire to thank Prof. Noah Morris for his interest in this work; Mr. David T. Gibson, D.Sc., of the chemistry department in the university, and Dr. W. D. C. McCrorie, assistant radiologist at Stobhill Hospital, for advice and criticism; and Sister H. D. Collins and Sister J. E. Rennie for their coöperation.

### REFERENCES

Adams, W. L. (1939) *Arch. intern. Med.* **63**, 1030.
Clark, A. J. (1940) Applied Pharmacology, London, p. 314.
Cushny, A. R. (1941) Pharmacology and Therapeutics, London, p. 71.
Dilling, W. J. (1940) Materia Medica and Therapeutics, London, p. 70.
Freezer, C. R. E., Gibson, C. S. and Matthews, E. (1928) *Guy's Hosp. Rep.* **78**, 191.
Hurst, A. F. and Stewart, M. J. (1929) Gastric and Duodenal Ulcer London, p. 402.
MacKenna, R. M. B. (1931) *Lpool Med-Chir. J.* **39**, 54.
Odier, L. (1903) Manual of Practical Medicine, Geneva. (Quoted by MacKenna.)
Poulsson, E. (1940) Textbook of Pharmacology and Therapeutics, London, p. 462.
Whitla's Pharmacy, Materia Medica and Therapeutics, London, 1933, p. 315.

## BLAST INJURY OF THE LUNGS

J. N. O'REILLY, D.M. OXFD, M.R.C.P.
MEDICAL SUPERINTENDENT OF ST. MARGARET'S EMERGENCY HOSPITAL

S. ROODHOUSE GLOYNE, M.D. LEEDS,
PATHOLOGIST TO THE HOSPITAL AND TO THE LONDON CHEST HOSPITAL

MUCH attention has been given lately to the effects of the blast of high explosive on people in the immediate neighbourhood. Apart from its scientific interest a careful study of the subject is of great importance in deciding correct treatment, and we are therefore recording our experiences in the treatment of a series of cases of men suffering from blast injuries of varying severity.

On Nov. 18, 1940, a high-explosive bomb dropped close to a wooden hut housing a number of soldiers. The hut was demolished and almost all of the men within were affected to some extent. Of those admitted to hospital 9 were dead on arrival or died within a few minutes. The majority of these 9 had no external injury and had not been buried; no autopsy could be held on them because of pressure of work in looking after the living. A number of other men were picked up dead but were taken straight to a mortuary; they were examined by a medical officer who also reported little evidence of external injury. Of the men who survived for an appreciable time after admission, 8 were suffering from severe pulmonary blast, 2 others had severe blast injuries associated with injury to the chest wall, and 7 had lesser degrees of blast injury from which they made uninterrupted recoveries. These 17 cases form the subject of this paper.

The men were admitted within two hours of exposure to H.E. blast. The circumstances have been reconstructed with some care and there is little doubt that with two exceptions, cases 9 and 10, these men suffered from the effects of blast only. The men were billeted in wooden huts which formed part of a small pleasure fair ground. There was a bright moon with a thin layer of cloud. A sentry observed the descent of a parachute and ran to warn his sleeping comrades. He did not succeed in rousing them before the bomb struck a wooden tower close to the huts. The explosion was of such violence as seriously to shake the hospital over two miles away. The huts were completely demolished. Rescue work was begun immediately and many of the men were got out at once. Others were buried under debris which was not of a heavy character. None of the patients

included in this paper were buried, so far as could be ascertained. Other patients, who were known to have been pinned under beams, have not been included; some of these had injuries requiring surgical treatment, but one of the striking things about this incident was the absence of severe crushed or lacerated wounds. The men were in bed on the ground floor, and the complicating factors of trauma due either to falling debris or to being blown against walls were absent except in cases 9 and 10. The circumstances of the injury comply with the criteria set up by Zuckerman (1940) in his experimental work as nearly as is likely to be found in human cases.

### SEVERE CASES

CASE 1.—Severely shocked and dyspnœic; complained of great pain in chest and abdomen. Very restless in spite of morphia gr. ¼. Great diminution of air-entry with numerous coarse râles over whole chest; percussion unimpaired except at right base. Abdomen rigid and painful, and these signs dominated the picture. After resuscitation with warmth, oxygen and a plasma transfusion (1 pint) was taken to theatre and laparotomy performed. Few small subserous hæmorrhages found but no gross trauma. Patient collapsed and died on table about 4 hours after original injury.

*Autopsy.*—Well covered. No sign of injury except superficial abrasion about 4 in. by 2½ in. over right shin. Clean laparotomy wound. *Neck.* Carotid sheath and great vessels surrounded with partially clotted blood. No tear discovered in vessels. Thymus persistent, but appeared healthy and contained no hæmorrhages. *Thorax.* Each pleural sac contained about 2 pints fluid blood, but no ruptured vessels found. No adhesions. Hæmorrhage had occurred outside parietal pleura, most obvious along line of ribs. Irregularly shaped bright red hæmorrhages also seen beneath visceral pleura; most extensive posteriorly. Mediastinum filled with blood mostly fluid. *Trachea and main bronchi* exhibited intense congestion of mucous membrane with numerous small hæmorrhages. *Lungs* on section were bright red, resembling congestive stage of extensive early lobar pneumonia. Congestion best seen in peripheral portions, where elongated bands of dark red hæmorrhage were running parallel with pleura and about ¼ in. beneath it. Numerous small rounded hæmorrhages in other parts of lungs. On the whole, these appearances more definite in lower than upper lobes, and more in posterior than anterior portions. Nothing to suggest disease prior to injury. *Pericardium* showed no free blood, but small hæmorrhages beneath visceral layer. *Heart* healthy but contained fluid blood in all chambers. *Abdomen.* Peritoneum contained no free blood. Some small hæmorrhages beneath serous coat over cæcum and appendix and beneath peritoneum over psoas muscle on right side. Few subperitoneal hæmorrhages in left hypochondrium, and beneath serous coat of small intestine, but bowel contained no blood and showed no ulceration. Small subcapsular hæmorrhages in spleen, kidneys and liver, but these organs otherwise healthy. No lesions in suprarenals. Gall-bladder healthy; no hæmorrhages. Head of pancreas contained hæmorrhages. Bladder healthy and contained clear urine. No fractures noted. *Central nervous system.* Brain congested with some small submeningeal hæmorrhages over vertex and base. A little free blood in ventricles. No lesions in substance of brain.

*Histology.*—Lesions in lungs patchy. In places structure was little, if at all, altered; in others intense outpouring of erythrocytes completely obscured structure. Between these two extremes were areas, whose air-spaces were still clearly outlined with intact capillary loops, and were filled with erythrocytes. Fibrin and free blood-pigment also present in small amounts, and scattered throughout the air-spaces were numerous polymorphonuclear leucocytes and macrophages. Latter contained considerable amount of blood-pigment, and were morphologically identical with heart-failure cell seen in passive congestion. Most of capillaries bounding air-spaces contained only a few red cells; some loops contained none at all. Elastic fibres ruptured in several places. Some areas showed nothing but masses of erythrocytes with isolated fragments of ruptured elastic tissue masking alveolar structure. Many respiratory bronchioles in these areas also filled with erythrocytes and fibrin, while small bronchi mostly showed desquamation of epithelium with collections of leucocytes filling lumen. In sections of peripheral portions of lung, deep layer of pleura contained masses of erythrocytes lying between collagenous fibres; in places, this outpouring of red cells had separated pleura from lung beneath. Few streptococci seen, but no areas of bronchopneumonia.

CASE 2.—Grossly shocked, dyspnœic and cyanotic, complaining of pain in chest retrosternally and in both flanks. Rather restless. Given usual resuscitation treatment of warmth, morphia and oxygen; on account of condition not moved from resuscitation ward for sixteen hours, when temperature was 100° F. and he had recovered sufficiently to justify moving. Diminished air-entry and coarse râles all over chest, without alteration of percussion note. Radiogram (fig. I, plate) showed heavy mottling in whole left lung field and a right mid-zone. Abdomen rigid and tender. During next 12 hours was kept warm and recovered to some extent. Vomited several times coffee-ground vomitus, not examined for blood. Next day considered well enough for transfer to Chest Unit under care of Prof. R. V. Christie, to whom we are indebted for subsequent history. On arrival was restless and ill with high colour and some cyanosis; dyspnœic; drank greedily but still vomiting large amounts of thin brownish fluid which gave faintly positive guaiacum reaction. Diminished movement on left side of chest and many râles and rhonchi audible, especially in left axilla. During next few hours improved, though still irritable, dyspnœic and rather more "bubbly." Venesection attempted twice, second time successfully, with a great relief of restlessness and dyspnœa. Vomiting also ceased. Few hours later (48 hr. after incident), became restless and delirious. No râles then audible. Soon afterwards collapsed and died in spite of attempted blood-transfusion.

*Autopsy.* (Professor Hadfield).—No gross injury. Some hæmorrhages between parietal pleura and thoracic wall. At least two-thirds of left lung and half of right lung consolidated. Extensive dark subpleural hæmorrhages, continuous with deeply seated hæmorrhages. Consolidated parts colour of dark venous blood-clot, but "their ill-defined edges were bright red, fading off gradually into normally coloured lung. Throughout this dark coloured consolidated lung there were many scattered areas, ashen-grey in colour and sharply demarcated from the surrounding tissues."

*Histology.*—Appearances bore striking resemblance to those found in hæmorrhagic infarct. Little evidence of widespread alveolar rupture and Hadfield took the view that bleeding was due to diapedesis. In the grey areas each alveolus "contained a precisely staining close-marked film network in the meshes of which considerable numbers of wandering cells and partially hæmolysed red cells were lying. The general appearance bore a rather striking superficial resemblance to that of lobar pneumonia in the stage of red hepatisation." Wandering cells predominantly monocytic.

CASE 3.—Severe shock, pallor, dyspnœa and cyanosis, with great pain in chest and back. Distant breath sounds, with coarse râles all over both lung fields. Morphia and oxygen given and some degree of recovery (T. 104° F.). Next day appeared somewhat better, but still very ill (T. 102° F.). On 20th, 48 hours after injury, was again much worse. Impaired percussion note and tubular breathing at right base—i.e., clinically a lobar pneumonia. Scattered râles still audible over rest of both lungs. Radiogram (fig. II) showed heavy mottling over both lung fields with consolidation at right base. Became worse and died about 55 hours after incident.

*Autopsy.*—Massive hæmorrhages into substance of lung tissue on both sides, with evidence of consolidation at right base. Mediastinal and extrapleural hæmorrhages present. Unfortunately no portions of lungs preserved for section. No evidence of other injury.

CASE 4.—Shocked, though less so than previous cases; some dyspnœa and cyanosis. Diminished air-entry at both bases and scattered râles over both lung fields. Percussion note normal. Complained of some pains in chest and abdomen, but these grew less severe after a time (T. 101·2° F.) Next day much better. Still diminished air-entry at lung bases and scattered crepitations over whole of both lungs. Radiogram (fig. III) showed heavy mottling in left lung, less in right. Transferred to care of Professor Christie who has provided subsequent history. On arrival no dyspnœa or cyanosis. Nothing abnormal heard on auscultation anteriorly. Nov. 21: bruising of right chest wall; diminished movement on left; pulmonary second sounds (P 2) accentuated; B.P. 140/88 mm. Hg. Nov. 23: vital capacity 2500 c.cm. Dec. 2: vital capacity 3800 c.cm.; X ray clear; P. 2 less accentuated. Dec. 9: P 2 more accentuated; ½ oz. bright blood coughed up; X ray normal; no abnormal physical signs. Dec. 15: coughed up dark red blood; P 2 still very loud. Jan. 5, 1941: bright red blood intimately mixed with mucus coughed up; P 2 + +.

The cause of the recurrent hæmorrhages and their relation to the accentuated pulmonary second sound are obscure.

CASE 5.—Severe shock; complained of pain in chest. Dyspnœa but no gross cyanosis. Highly resonant percussion note and much diminished air-entry at left base. Elsewhere percussion note normal. Scattered râles over rest of both lung fields. Pneumothorax on left side diagnosed and confirmed radiologically (fig. IV). Next day breath sounds at left base tubular paravertebrally and absent in axillary line. Few crepitations still audible elsewhere, notably at right base. Very gradual improvement in physical signs until on Jan. 7, 1941, chest appeared normal. General condition improved rapidly after first few days and patient made no complaints.

CASE 6.—Moderately severe shock; considerable dyspnœa and cyanosis. Complained of pain in chest and within an hour had brisk hæmoptysis of 5 oz. which relieved his pain. Rhonchi all over chest and was wheezing like an asthmatic. It was thought that condition might be due to inhaled dust, but no evidence of this either then or later. Resuscitation by oxygen and warmth; T. 99·6° F. Next morning much better; still cyanosed but breathing more easily. Radiogram (fig. V) showed characteristic mottling in both lungs. Still rather wheezy. By evening, 36 hours after the incident, temperature 101° F.; clinical signs of consolidation at left base. Nov. 20: signs of consolidation at left base more definite and some râles audible; right base also congested; rhonchi over rest of lung fields had diminished; T. 104° F.; dyspnœic, cyanosed and delirious. Nov. 21: general condition much improved; left base still consolidated and crepitations audible at right base; T. 101° F. Nov. 22: very much improved; left base clearing; basal crepitations on both sides; still a little wheezy.

Thereafter the patient made a good recovery though air-entry remained weak at the bases for several weeks. The final radiogram showed complete resolution.

CASE 7.—Severe shock, pallor, cyanosis and dyspnœa. Complained of pain in chest and abdomen. Resuscitation measures: warmth and oxygen and plasma transfusion. Air-entry poor and râles present all over both lungs. Most striking clinical feature was completely rigid and painful abdomen. Laparotomy decided on; nothing found except few small subserous hæmorrhages; abdomen closed. Nov. 19: air-entry into right base diminished and percussion note impaired; spitting up small quantities of dark blood; T. 104° F., P. 142; later in day tubular breathing became audible at right base. Nov. 20: very ill; right base dull to percussion and tubular breathing still a feature; T. 105° F.; complained of diplopia and had a convulsive movement of frontalis muscle, apparently a tic. Nov. 21: dull in right axilla and base; breath sounds weak with some râles; few rhonchi at the left base, where breath-sounds also weak. Nov. 22: signs as before; radiogram (fig. VI) shows collapse of right lower lobe; T. 102° F. Nov. 28: general improvement; breath-sounds still weak in right axilla and at base; tic still present; diplopia remains, but only on lateral deviation of more than 45°; no obvious weakness of oculomotor muscles. Nov. 29: T. 103° F., abdominal wound slightly septic; tubular breathing at right base with some râles; breath-sounds weak in axilla, normal over middle lobe; mucopurulent sputum. Thereafter patient made gradual recovery with re-expansion of the collapsed lobe.

The diplopia is difficult to explain. It may have been due to a cerebral contusion. Eventually it disappeared completely.

CASE 8.—Some shock, bruising and pain in chest, particularly on right. Breath-sounds weak at both bases; no added sounds. Nov. 21: some cough and pain; mucopurulent sputum; no blood; no dyspnœa. Nov. 23: still coughing; mucopurulent sputum; no added sounds. Some pain. X ray showed no abnormality. Nov. 27: pain in region of right base and axilla; breath-sounds weak, percussion note normal; no added sounds; pain in side on deep breathing; T. up to 100° F. and has not settled since. Nov. 24: general malaise; pain on breathing; no definite signs except weak breath-sounds at right base. Nov. 29: no change; T. 102° F. Nov. 30: T. 101° F.; pain in chest still; impaired note at right base with weak tubular breathing and few râles; sputum purulent. Dec. 1: much improved; less pain; breath-sounds very weak; no added sounds. Thereafter there was gradual resolution, still incomplete 6 weeks later.

### CASES WITH DAMAGE TO CHEST WALL

Both cases 9 and 10 had injuries to the chest wall. Their clinical appearance, however, was that of blast injury to the lungs. Case 9 had all the characteristics of severe pulmonary injury and damage to the chest wall was discovered only at autopsy.

CASE 9.—Severe shock, dyspnœa and cyanosis. Pain retrosternally and on both sides of chest, particularly on deep breathing. Complained continually of severe pain in abdomen. Normal percussion note with poor air-entry all over chest, particularly at bases. Coarse râles all over both lungs. Abdomen rigid and tender; no shifting dullness. After resuscitation improved slightly but remained dyspnœic and cyanosed. Pulse rapid and of poor volume. Patient died 14 hours after explosion.

*Autopsy.*—Well covered. No external evidence of injury. Simple transverse fracture of sternum and fracture of pelvis. Massive hæmorrhages in posterior mediastinum in loose tissue behind and around great vessels; apparently due to rupture of small veins, for no damage to large vessels could be detected. Hæmorrhages also found in extrapleural tissues of intercostal spaces, so that inside of thorax appeared black between white bands of ribs. No evidence of visceral injury in abdomen. Gross hæmorrhages in psoas sheaths on both sides. Visceral pleuræ showed large irregular blotches of dark red hæmorrhage and areas of ecchymoses. Lungs much congested with here and there large irregular hæmorrhages similar to those in pleura. Standing out clearly by contrast on congested background were many pin-point yellowish-white areas of early bronchopneumonia. Right apex and anterior free border of lung emphysematous; at base of lower lobe on this side was small collection of dilated bronchi suggesting developmental bronchiectasis, unrelated to injury. Sections of bronchial wall showed intense infiltration of mucosa and submucosal layers with blood-corpuscles and blood-pigment. Histological appearances resembled those of case 1, but rupture of elastic fibres less definite. Numerous areas of very early bronchopneumonia, containing short chains of streptococci.

CASE 10.—Moderate shock. Complained of pain in chest especially on right. Breath-sounds weak all over but especially at right base. Crepitus audible and palpable; diagnosis of fractured ribs made. Radiologically 8th and 9th right ribs seen to be fractured; small hæmothorax. Areas of mottling in both zones. Pain and poor air-entry continued for some days but patient made uninterrupted recovery. X-ray appearances cleared up in a few days.

### SLIGHT CASES

The remaining cases are not recorded in detail, since on account of pressure of work no other investigations were carried out. They are none the less to be considered as mild cases of blast injury.

CASES 11–17.—These 7 men were obviously less ill than any of foregoing. Came in somewhat shocked and dyspnœic, with some cyanosis and pain in chest and back. Breath-sounds distant; no added sounds. Percussion note normal. Symptoms disappeared in a few days and recovery was smooth.

### CLINICAL FEATURES

The features of the cases which impressed the clinical observer were as follows.

*Shock* was profound in the 5 more serious cases. Blood-pressures were not taken, but pallor, cyanosis, and rapidity and poor volume of the pulse were noted. The other 5 patients described in detail were severely shocked, though less so than the foregoing. The remaining cases were definitely though not dangerously shocked.

*Dyspnœa* was a constant feature of all the patients. The difficulty of respiration was due in part to pain and in part to extreme bulging of the chest, which appeared to be in the position of almost full inspiration. This bulging has also been noted by Dean, Thomas and Allison (1940). Dyspnœa continued till death in fatal cases; it remitted to some extent after 24 hours in cases 5, 6 and 7, and became noticeable again as the signs of pneumonia developed; in cases 4 and 8 it disappeared within 24 hours.

*Cyanosis* was obvious in the most severe cases and present in all the others. In cases 1, 2, 3 and 9 it remained till death. In cases 5, 6 and 7 it disappeared within 24 hours. Thereafter the picture was confused by the administration of sulphapyridine. The other cases had cyanosis on admission but lost it after 24 hours.

*Pain in the chest.*—Great pain was complained of by cases 2, 3 and 9, all of whom died. The pain was of two distinguishable types—a central deep constant pain which was especially severe in cases 2 and 9 and a less severe pain felt more laterally and made worse by deep breathing. The other patients complained of pain of both types, but it was noticeable that the less severely injured made little complaint of the central pain while complaining that the lateral pain was preventing them from breathing. The central pain disappeared in the recovering cases after a few days, while the other pain remained for at least a week. The cause of the pain in the chest is not clear. The deep central pain may be related to the mediastinal hæmorrhages. The innervation of the loose tissues of the mediastinum does not seem to have been well worked out, nor is it clear what is the effective pain stimulus. The pain felt in the sides may have been due to contusion of the intercostal muscles, since at autopsy hæmorrhages into the spaces extrapleurally was a constant finding. These hæmorrhages may also account for the bulging of the chest wall. Contusion of the muscle might well result in spasm and contraction of the intercostal muscles causing the chest to assume the inspiratory position.

*Pain in the abdomen* was an important feature of this series. This was particularly striking in cases 1, 2, 3, 7 and 9. Cases 1 and 7 presented the appearance of acute abdominal disaster, having great pain and tenderness and rigid abdominal walls. It was decided that laparotomy was necessary but nothing abnormal was found except a few small subserous hæmorrhages. The abdomens were closed at once. Case 1 died on the operating table. It was then decided that the other cases who were not less like acute abdomens should be left. Case 2 vomited at intervals during the first 24 hours, at times bringing up a brown vomit. He was transferred to the care of Professor Christie, who noted the condition but decided to await events. Cases 3 and 9 retained their abdominal tenderness and rigidity till death, but the signs ceased to dominate the clinical picture as they had done in the early stages. Autopsies were carried out on cases 1, 2, 3 and 9. In each of these hæmorrhages were found extrapleurally when the viscera were removed from the thorax, the intercostal spaces appearing black in contrast to the white bands of the ribs. It seems possible that these hæmorrhages caused irritation of the intercostal nerves with consequent rigidity of the abdominal wall. Zuckerman (1940) reports that this finding is also present in some experimental animals and finds the hæmorrhages continuous with those in the sheaths of the intercostal nerves. He agrees that this may be the cause of the abdominal signs. Another possible cause of the rigidity is that the abdominal muscles have themselves been damaged. No investigation of this point was made. Stress is laid on the clinical findings pointing to acute abdominal injury because of the logical course of treatment which they suggest. The two laparotomies were undertaken in men whose lungs were known to be damaged and the negative findings were an unpleasant surprise. At autopsy in case 1 lesions were found which made it unlikely that he would have lived. Case 7 survived after a stormy period.

*Hæmoptysis.*—Free hæmoptysis was observed in cases 4 and 6. The amounts of blood were about 4–5 oz. Both men were seriously affected by the blast, but neither at any time gave cause for grave anxiety. Both men were undisturbed mentally by the hæmoptysis and both seemed somewhat easier after it. The blood was noticed about an hour after the blasting and the duration of the free hæmoptysis was about 15 min. Thereafter only small amounts of stained sputum were brought up. Case 1 was noticed to have brightly stained froth in his air-passages while under the anæsthetic for his laparotomy. Case 7 brought up a little dark-stained sputum during the day after the incident. A few of the other men brought up dark blood in the sputum after 24–48 hours, but no other cases had free hæmoptysis. Some of the men brought in dead or dying had blood staining in the nose and mouth without visible injury. This accords with the more detailed observations made by Hadfield in his autopsies. Other men who were operated on for lacerations and other injuries and are not included here were found to have blood-stained secretion in the trachea. These patients were certainly suffering from blast. Apart, however, from the 2 cases mentioned hæmoptysis was not a prominent symptom.

*Cough and sputum.*—None of the men were noticed to be coughing during the first twenty-four hours after blasting. After this a number had coughs, some of which were troublesome. The sputum was moderately thick, muco-purulent, and in several cases stained with dark blood for 24–48 hours. In uncomplicated cases, the cough and sputum disappeared in ten days; they persisted in the cases with severe late effects or complications.

*Restlessness* was extreme in some cases. Case 1 was quite uncontrollable even after repeated doses of morphia. At autopsy some subarachnoid hæmorrhage was present in the vertical region. There was no evidence of cranial injury. Case 2 was restless during the first few hours but gradually became quieter. After transfer to the Chest Unit he was again restless and continued so most of the time until his death. Case 3 was exceedingly restless and controlled only by repeated doses of morphia. Case 9, although in severe pain, was less restless than the foregoing. He too had some subarachnoid hæmorrhage without obvious cranial injury. The other cases were restless in proportion to the degree of injury but they were all controlled by morphia.

Restlessness is therefore a constant symptom of blast injury and bears a direct relation to the severity of the damage. The pathological findings suggest that it is not due to the pain but rather to an irritative lesion within the cranium. This is supported by the observation that other victims of this incident whose principal injuries were caused by violence (e.g., falling debris) were restless out of all proportion to the severity of their injuries. The most extreme case was that of a man with a fractured femur who was almost maniacal for a week after the injury. There was no gross evidence of cranial injury or pulmonary damage and the femur was successfully reduced a few jours after injury. Certain other men with cranial and facial injuries gave no special trouble and one lad with extensive and painful burns was kept quiet without difficulty. It seems justifiable to conclude that extreme restlessness is a result of blast injury to the head.

*Ruptured ear-drums* were found in 25 men. Some of these developed purulent otorrhœa which in a few cases proved very resistant to treatment.

### PHYSICAL AND RADIOLOGICAL SIGNS

The physical signs in the chest varied with the severity of the condition, but some were common to all patients in this series. The chest was held about three-quarters expanded. Respiratory movement was, therefore, much reduced, but was generally equal on the two sides. Attempts at deep inspiration were limited by the expansion of the chest and the fact that the movement was painful. Palpation gave no additional information. The percussion note was resonant at all areas in the early stages. On auscultation, the breath-sounds were notably weak especially at the bases. Coarse râles were audible over the whole of the lung fields, numerous in the fatal cases 1, 2, 3 and 9 and less numerous in the other severe cases 4, 5 and 7. Case 6 was peculiar in that the added sounds were rhonchi. The man was wheezing like an elderly bronchitic, though he had had no bronchitis previously. The less severe cases, 8 and 10–17 inclusive, had no added sounds. The râles persisted until death in cases 2, 3 and 9, where observations were made, though they became less numerous in the period of partial recovery which each patient showed. Case 1 died without further observation on this point. In cases 4, 5 and 7 the generalised râles became less numerous and disappeared in the course of a few days. They appeared to persist longest at the lung bases.

A striking feature was the development of the clinical appearance of lobar pneumonia at one lung base. This was heralded by a more or less sharp rise of temperature. Case 3 had a temperature of 104° F. 12 hours after the blast. After 48 hours the percussion note at the left base was much impaired with tubular breathing; this clinical finding was confirmed by X ray; he died a few hours later. Case 5 showed a similar condition at the left base paravertebrally 30 hours after the blast, though here the picture was complicated by a small clinically

and radiologically demonstrable pneumothorax. Case 6 developed pneumonia at the left base 36 hours after the blast. He had a temperature of 101° rising to 104° F. and had some hours of delirium. Case 7 had clinical signs of pneumonia 24 hours after the blast. This was confirmed radiologically, though it was shown shortly afterwards that he had collapse of the right lower lobe. Case 8 was peculiar in that his lungs were clear for 8 days after the explosion, though he had some pain, cough with sputum and an irregular temperature. He then complained of sharp pain in his right side, worse on inspiration, and after a further 36 hours had typical clinical and radiological pneumonia of the right lower lobe. All the cases were treated with sulphapyridine and the duration of the pneumonia was short, with the exception of case 7 who was seriously ill for some days. Pathological examination of case 9 showed, however, that the inflammatory condition was a bronchopneumonia. The correct explanation seems to be that the physical signs are largely due to the effusion of blood which corresponds roughly to the stage of red hepatisation of lobar pneumonia and may be expected to give rise to the same physical signs.

The less severely blasted cases 11–17 showed no definite physical signs except the bulging of the chest wall with its associated limitation of movement and respiratory excursion. The condition became normal in 7–10 days.

Radiograms of the chest were taken within 72 hours in cases 2, 3, 4, 5, 6, 7 and 10. Cases 1 and 9 were too ill to disturb. The severe cases 2, 3 and 4 all show similar pictures (figs. I, II and III). There is heavy mottling over large areas of the lung fields. In case 2 it extends through the whole of the left lung field. The right middle lobe is seriously affected and to a lesser extent the upper and lower lobes. The picture reproduced in fig. I was taken within 12 hours of injury.

The radiogram of case 3, taken about 48 hours after the injury (fig. II) shows the mottling scattered through both lung fields. The dense shadow seen at the right base corresponds with an area of pseudo-pneumonic consolidation which was evident clinically and was found at autopsy.

Case 4 was X rayed about 30 hours after injury. Fig. III shows the mottling scattered throughout the left lung and less densely through the right lung. Next day the condition had cleared considerably except at the left base, where the shadowing was denser and more homogeneous. Five days later the lung had largely cleared and subsequent radiograms showed no abnormality. This heavy mottling must be taken as the characteristic radiological appearance after severe blast injury. It is due to the interstitial and alveolar hæmorrhage and varies in density and extent with the clinical and pathological findings. In severe non-fatal cases it clears rapidly pari-passu with the clinical signs, translucency of the lung being normal within 7 days. A rather less severe case (case 6) shows similar mottling of both lung fields 24 hours after injury (fig. V). These were still present four days after injury when the radiological appearances of a right basal pneumonia confirmed the physical signs; 10 days after the injury the mottling had disappeared though the lung striation was rather heavy.

Case 5 showed a small spontaneous pneumothorax at the left base together with some mottling in the left mid-zone (fig. IV). Both cleared up in the course of a few days.

A radiogram of case 7 taken about 54 hours after blasting showed heavy mottling in the left mid-zone and collapse and consolidation of the right lower lobe (fig. VI). After treatment the mottling cleared up in the course of 10 days while the collapsed lobe gradually re-expanded completely.

Case 8 had no radiological lesions when first X rayed a week after the explosion; 4 days later he had some consolidation at the right base which resolved very slowly. Case 10 showed similar mottling in the early stages, but cleared rapidly.

## PATHOLOGICAL FINDINGS

The most striking feature in the autopsies was the effusion of blood. This varied from capillary oozing to large hæmorrhages, in one case filling both pleural sacs and the tissues of the neck around the carotid sheath. For the most part this blood remained fluid.

Histologically the chief characteristics were (*a*) an extensive outpouring of erythrocytes, in places accompanied by fibrin formation and the accumulation of blood pigment, though these were not constant; (*b*) rupture of elastic tissue and capillaries in the most affected parts; and (*c*) secondary infection with streptococci and bronchopneumonia. The function of the lungs must obviously have been impaired by the filling of respiratory bronchioles and air-spaces of large areas with blood, and by the rupture of the elastic tissue and capillaries. If the initial period of shock could have been overcome, the blood corpuscles would presumably have been removed from the air-spaces by the tissue defences as they are in pneumonia, but ruptured elastic fibres and capillaries would not be likely to undergo repair. Blast lung, therefore, may suffer both a temporary and permanent impairment of function, varying with the extent of the initial hæmorrhages.

The presence of streptococci and bronchopneumonia is noteworthy. Probably very few lungs are completely free from organisms even in health, and the risk of secondary infection in blast lung is not negligible.

These investigations were made before Robb-Smith's paper (1941) on fat-embolism was published. Subsequent investigation of the material with frozen sections did not show any emboli. No pictures of the post-mortem specimens or slides can be reproduced owing to the destruction by enemy action of all the pathological material with the exception of one rather unsatisfactory specimen.

## TREATMENT

*Shock.*—All cases of shock were treated by standard resuscitation methods—heat and morphia. Heat was applied to the most serious cases by means of electric cradles, to others by hot bottles. Morphia was given to control restlessness. The initial dosage was gr. ¼. This kept the majority of cases fairly quiet. Cases 1 and 2 however were violently restless and complained of very great pain, and further doses of morphia gr. ¼ had to be given. It has been argued that morphia in shock has its dangers, particularly when there is damage to the lungs. It seems likely, however, that the restlessness and distress of the patient are far more dangerous, and morphia is the only drug which will control them.

*Oxygen.*—Cases 2, 3, 4, 5, 6, 7 and 9 were given continuous oxygen. Nasal catheters and spectacles were used as B.L.B. mask were not supplied until later. Some difficulties were experienced on account of the restlessness of the patients, but the relief afforded by oxygen was obvious. Later, when B.L.B. masks were available, they were used, particularly in the treatment of the pneumonias.

*Transfusions* were given to cases 1, 2, 3, 7 and 9. The transfusion fluid was plasma for cases 1, 2 and 3, and blood for case 9, while case 7 received both plasma and blood. None of the patients received more than 2 pints and the immediate transfusion of large quantities of plasma as recommended by Whitby and his co-workers (1941) was not undertaken. It seems doubtful whether blood should be given unless there is concomitant hæmorrhage. Christie observed that there was dilatation of the veins of the neck in one of the cases transferred to him (case 2). This man was much relieved both of his restlessness and the congestion of his lungs by venesection. Christie further noted that prior to venesection, the hæmoglobin was 125%. The indication is for plasma and not blood. These conclusions are confirmed by the pathological findings. It is difficult to see how a lung containing large areas of effused blood, often with rupture of the elastic tissue and capillaries, can benefit by blood-transfusion.

*Sulphapyridine* was given prophylactically to cases 3, 5, 6 and 7. The dose was two tablets 4-hourly. Case 8 received three tablets followed by one tablet 4-hourly. This dosage appeared to have no effect in preventing the development of pneumonia. When the pneumonia developed the dosage was increased to two tablets 3-hourly. The temperature dropped to normal within 48 hours in cases 5 and 6. Case 7 had pyrexia lasting 6 days and settled down gradually. Case 8 was treated for 48 hours, and then, as the temperature had more or less settled, the sulphapyridine was stopped; it was started again when he developed signs of pneumonia 9 days later.

DIAGNOSIS

The diagnosis of blast injury of the lung is not difficult in the most severe cases. Gross shock, out of proportion to the degree of injury, pain in the chest, restlessness, dyspnœa and cyanosis are the main symptoms. Blood-stained sputum or free hæmoptysis may be present. Bulging of the chest wall, poor respiratory excursion, normal percussion note with perhaps impairment in one locality, distant breath-sounds in all zones and numerous coarse râles or sometimes rhonchi are the main physical signs. In milder cases the degree of the symptoms is less, and restlessness and cyanosis may be absent. The physical signs are similarly less prominent and added sounds are few or absent. X-ray appearances are characteristic. They resemble in some measure a patchy pneumonic consolidation to which they are histologically very similar. In favourable cases resolution is very rapid, the lung clearing in 4–7 days.

The principal difficulties arise in cases where there are gross other injuries, particularly injuries to the chest wall. Fractures of the sternum and ribs may confuse the picture. Hæmothorax gives a similar picture to blast injury but produces dullness on percussion. Pneumothorax similarly may give rise to difficulty, but the hyper-resonant percussion note will point to the diagnosis. Hæmothorax and pneumothorax may both be due to blast injury. Most blast injuries occur in cases which have also contusions or crush injuries of the chest. Osborn (1941) contends that since they are so often found together they should be described together. But since blast injuries and crush injuries can be studied separately in animals it seems desirable that they should be kept separate as far as possible in human material also, at least until it can be shown that the pathology and treatment are the same.

No confirmation is supplied by this series of cases of Osborn's view that blast injury is best marked in the phrenico-costal sinus. The severe cases had contusions in the deep parts of the lungs and at the edges. The less severe cases had lesions in the thicker parts of the lungs, and showed no lesions in the sinuses. With regard to Osborn's "attempt to show that the same lesion may result from a sudden diffuse compression by bombs and mechanical means," it is perhaps a little premature to regard the distinction as only academic.

The importance of making a diagnosis of blast injury is great, since rest is of prime importance, and anæsthetics are contra-indicated.

SUMMARY

Eight severe cases of blast injury to the lungs without external injury and 2 associated with injury to the chest wall are described in detail; seven less severe cases are also recorded. The main symptoms were grave shock, prostration and restlessness, respiratory difficulty and pain in the chest. The principal physical signs were bulging of the chest wall, congestion and consolidation of the lungs. Bronchopneumonia was a common sequel. The radiological appearances are characteristic. The treatment consists of heat, morphia, oxygen and plasma-transfusion. Blood is only indicated if there is anæmia. Chemotherapy should be started as soon as the patient has recovered a little.

Five cases showed severe abdominal signs, and two were explored. Operation is contra-indicated unless the signs point to a specific lesion. A general anæsthetic should be postponed as long as possible. The patients should not be moved more than is absolutely necessary.

Pathologically, there was gross effusion of blood into the mediastinum due to rupture of capillaries. Naked eye, the lungs exhibited patches of intense congestion resembling early lobar pneumonia. Histologically, there was (*a*) extensive outpouring of erythrocytes, (*b*) rupture of elastic tissue and capillaries, and (*c*) secondary infection with streptococci causing bronchopneumonia. No evidence of fat-embolism was seen.

We are indebted to Dr. W. A. Bullough, county medical officer, for permission to publish these cases.

REFERENCES

Dean, D. M., Thomas, A. R. and Allison, R. S. (1940) *Lancet*, **2**, 224.
Hadfield, G. and Christie, R. V. (1941) *Brit. med. J.* **1**, 77.
Kekwick, A. Marriott, H. L., Maycock, W. d'A, and Whitby, L. E. H. (1941) *Lancet*, **1**, 99.
Osborn, G. R. (1941) *Brit. med. J.* **1**, 506.
Robb-Smith, A. H. T. (1941) *Lancet*, **1**, 135.
Zuckerman, S. (1940) *Ibid*, **2**, 219.

# Reviews of Books

**Bone Graft Surgery in Disease, Injury and Deformity**

FRED H. ALBEE, M.D., F.A.C.S., president of the International College of Surgeons. London: D. Appleton Century Co. Pp. 403. 35*s*.

THE wide use which is now made of the bone graft in the surgery of disease, injury and deformity is so much taken for granted that one is apt to forget the debt owing to Albee for his pioneer work. Albee's name is associated with a fusion operation for spinal tuberculosis, and he still claims that this method of treatment supplants conservative measures, a view which has never been shared by British surgeons who find the chief value of the bone graft rather in the prevention and treatment of ununited fractures and in the ankylosis of joints. In this book Albee makes it clear that the success of any graft depends on the perfection of its fit. Inaccuracy spells failure. The ingenuity with which he has devised means of accurately fitting grafts deserves the highest praise and to the young surgeon who wishes to learn bone grafting surgery this book is indispensable. The author has drawn on a lifetime of experience and the methods described cover the widest range. As an account of the technique of bone graft surgery the book is supreme. It is attractively written and well illustrated.

**Medical Diseases of War**

(2nd ed.) Sir ARTHUR HURST, D.M., F.R.C.P. London: Edward Arnold and Co. Pp. 427. 18*s*.

THE experience gained in this war since the first edition in January, 1940, has increased this volume by 100 pages. Additions include: a full account of meningococcal fever, with the importance of the non-meningitic type stressed; a clear and well-illustrated section on malaria; an addition to the skin section on impetigo; the return of the chapter on amœbic dysentery from the parent volume of 1918; and a review of the "gastric" situation, probably the most important medical problem of this war. This is the only existing book on the purely medical aspects of war, and the appearance of a new edition to cover the altered situation is welcome. It is to be hoped that future editions will continue to cater for new aspects with further inclusions, even if some omissions have to be made to keep the work of serviceable compactness. For example, shock, resuscitation methods and blast injuries might displace subjects which have not been prominent in this war, such as trench fever and the dramatic type of hysteria. We would be sorry to see these last pages go on account of their interest and originality, but economy and price are important points in such a book, which has been invaluable in past war years and should continue to be so.

**The Medico-Legal Post-Mortem in India**

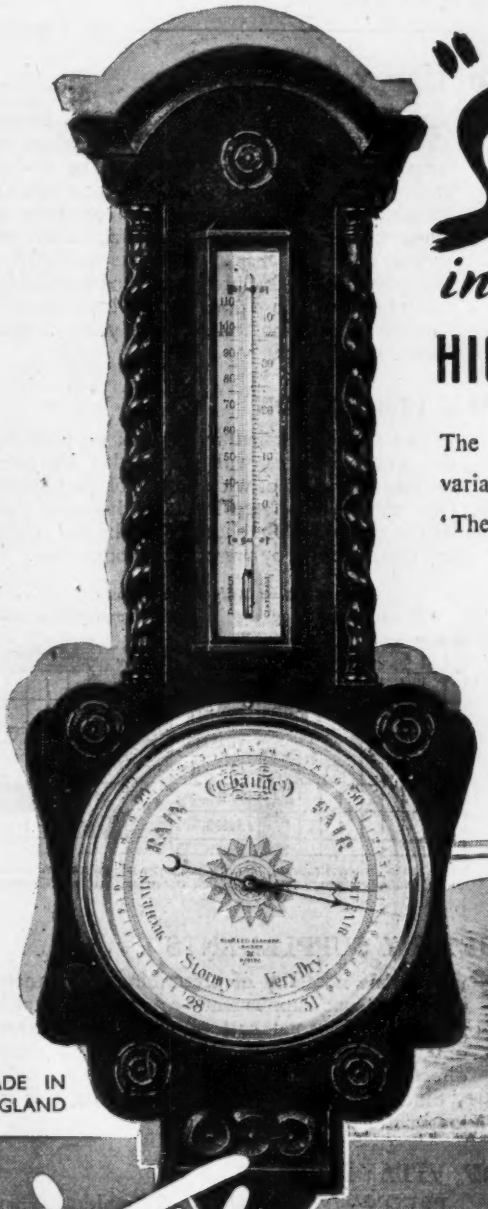
(2nd ed.) D. P. LAMBERT, M.D., D.T.M. & H., major, I.M.S. London: J. and A. Churchill. Pp. 113. 5*s*.

THE previous edition of this little book has evidently achieved the end which the author had in view when it was written, for a second edition now appears with but the slightest alteration in the general matter or arrangement of the text. We previously remarked on the value of Major Lambert's personal observations on the practical aspects of his subject. The book remains an excellent aid to the performance of medicolegal autopsies in India.

**Plant Science Formulæ**

R. C. McLEAN, D.Sc. Camb., F.L.S., professor of botany, University College, Cardiff; and W. R. IVIMEY COOK, Ph.D. Lond., F.L.S., lecturer in the department. London: Macmillan and Co. Pp. 203. 7*s*. 6*d*.

THIS is, as stated in the subtitle, a reference book intended for the use of plant science laboratories, including bacteriology. It contains a collection of formulæ which the authors have selected on the basis of their experience and that of others as of proved value. In addition to those concerned with the fixing, preservation and staining of material, formulæ for the preparation of the more customary reagents, nutrient media, photographic requirements and other laboratory needs are included. Whilst there will naturally be diversity of opinion as to what ought to be included or omitted from such a selection the work should prove a useful addition to the laboratory bookshelf.




# "Set Fair"

## *in the treatment of*

## HIGH BLOOD PRESSURE

The symptoms of high blood pressure, as variable as the weather, are greatly relieved by 'Theominal.' In this, the antispasmodic and vaso-regulator effect of the theobromine is assisted by the sedative action of the 'Luminal' component. In effect, 'Theominal' makes the patient comfortable.

BAYER

MADE IN ENGLAND

# 'Theominal'

BROMIDE OF PHENOBARBITONE AND THEOBROMINE

TRADE MARK

BAYER PRODUCTS LTD • AFRICA HOUSE • KINGSWAY • LONDON • W.C.2

245514

## WINTER INFECTIONS

# The Prophylactic Use of Vitamins

A question exercising the minds of many authorities to-day is the effect of widespread dietary deficiency, with a consequent loss of protective vitamins and minerals, and the possibility of an increased liability to a variety of infections.

The word "variety" is important. For since these deficiencies are so often of a multiple nature, and since the action of many of the deficient elements is inter-related, a supplement which provides one or two vitamins only can give little more than partial protection. These considerations are doubtless responsible, in some degree, for the success of Complevite—the only preparation in which all the vitamins and minerals known to be commonly deficient are combined in the actual quantities needed to make good the deficiencies revealed by recent surveys. The wide range of its effectiveness can be judged from the chart. It will be readily seen that Complevite is an ideal preparation to prescribe for the many patients whose poor general health and undue liability to infection follow upon years of multiple dietary deficiencies.

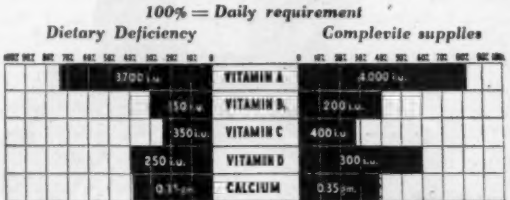
## EFFECTS OF MILK LIMITATION

There are good grounds for believing that dental caries is one of the results of the dietary deficiencies so prevalent to-day. Apart from the influence of bad teeth upon the digestion and general health, their carious condition is a sign to the physician that faulty diet has played at least a part in the production of the patient's other symptoms.

In support of this belief may be quoted, amongst other findings, the recently-published results of an investigation in the Island of Lewis in the Outer Hebrides, where 28 per cent. of the country children were found to be entirely free from caries, compared with 1.9 per cent. of children in London, and "all the positive indications support the view that only differences in diet can explain the facts."

The physician is only too well aware of the prevalence of dental disease, particularly among lower-paid workers; and it is interesting to note that a very recent examination of 1,352 male workers revealed that only 25 were free from dental disease (*Lancet*, 1941, 1, 51).

The possible limitation of milk supplies during the winter months will still further increase the calcium deficiency of wide groups of the population. One result will be seen in the teeth—more particularly in children. The shortage can be met effectively and inexpensively by prescribing Complevite.




* *The iron in Complevite exceeds the calculated deficiency expressly to combat the nutritional anæmia so common in children and in women of child-bearing age.*

## THE ECONOMICS OF DIETARY SUPPLEMENTS

In cases of acute illness it is natural that the cost of the necessary remedies should not be regarded as of primary importance. But in the all-too-prevalent cases of dietary deficiencies, where a prolonged course of treatment is indicated, the cost of the prescription has to be considered.

Hitherto, the physician has been faced with the unwelcome necessity of prescribing simultaneously more than one supplement—*e.g.*, liver oil, calcium, iron, etc., the total cost of which may prove an obstacle to the faithful observance of the doctor's directions.

Since the introduction of Complevite, this is no longer necessary.

## THE PRODUCTS OF VITAMINS LTD.

BEFORTISS (Brand) Vitamin B Tablets.—200 i.u. and 2 mg. per gm. For high dosage of the B complex. *Ampoules*—2, 10, and 25 mg. For high Vitamin $B_1$ dosage.

COMPLEVITE Tablets.—A multiple vitamin and mineral supplement. To make good the known deficiencies of vitamins and minerals in the average daily diet.

FERTILOL (Wheat germ oil) Capsules.—A highly active stable source of Vitamin E. For the treatment of habitual abortion, dietary sterility and certain neuro-muscular degenerations, etc.

PREGNAVITE Tablets.—A multiple vitamin and mineral supplement. Ensures an adequate supply of vitamins and minerals to meet the special requirements of pregnancy.

BEMAX.—Stabilised wheat embryo. The richest, natural source of Vitamins $B_1$, $B_6$, and E (320—420 i.u. $B_1$ per ounce).

*Vitamins Limited will be glad to supply literature and clinical sample of Complevite, Pregnavite, Bemax, Fertilol, Befortiss Tablets and Ampoules on request. Please state product in which you are interested. Vitamins Limited (Dept. LXF), 23, Upper Mall, W.6.*

# THE LANCET

*LONDON: SATURDAY, OCTOBER 11, 1941*


## BIPP AND ITS FRIENDS

TOWARDS the end of 1915 RUTHERFORD MORISON [1] first introduced bipp cream, consisting of one part of bismuth subnitrate and two parts of iodoform made into a paste with liquid paraffin, for the treatment of war wounds. At the time he was stationed in England, and most of his cases being late he merely enlarged the wound or abscess cavity and after complete hæmostasis dried the cavity with spirit and applied a small quantity of this paste to the walls. He then sutured the wound. He was astonishingly successful although, as he admitted, he had acted contrary to the canons of surgical teaching. A little more than a year later intermittent irrigation with Dakin's solution, as introduced by CARREL, became the popular method of wound treatment. To keep the wound under observation and see the pus washed away made a strong appeal, and, as THOMAS once wrote of other things, it is difficult to cure that "hankering to interfere." But bipp continued to be used by many surgeons although its effectiveness remained a puzzle. The bacteriologists have pointed out that in broth streptococci can actually be grown on the paste. MORISON was of course aware of this and he repeatedly referred to the fact that the wound discharges contained numerous organisms. A full bacteriological investigation of bipped wounds by CHAMBERS and GOLDSMITH [2] at that time showed that aerobic and anaerobic organisms could invariably be recovered but that there was no free proliferation. Yet these wounds healed as if they were surgically clean—there was no redness, no induration, and the granulations were vascular and firm. Similar observations on the healing of wounds despite a multiplicity of apparently virulent organisms have been made in this war by ORR-EWING, SCOTT and GARDINER,[3] in their bacteriological investigations on wounds treated in plaster.

Lately GURD and MCKIM [4] have recorded their successful experiences in the use of bipp for 25 years. They explain its action on a physical basis rather than from any special antiseptic rôle of iodoform or liberated iodine. They describe it as "curtain drainage." If on a smooth surface such as glass water is poured it will fill the area and stay. But if oil is poured on the glass first, water then applied will immediately float off. Thus on the walls of the abscess cavity or incised wound oiled with bipp the lymph will not adhere and clot but will continue to flow and there will be a continuous discharge of fresh leucocytes and antibacterial products. It is like the paraffined syringe of old for blood-transfusion, where the blood would flow without clotting. MORISON and others who use bipp have all commented on the free flow of leucocytic discharge. This lymph lavage—a "lymph leech" to prevent any stanching of the lymph outflow—was ALMROTH WRIGHT'S [5] concept of the physiological approach required for wound treatment. The drying of the wound with spirit, the use of only a small quantity of bipp to coat the walls (MORISON recommended that no more than two drachms should be used)—these are the rules that must be observed. GURD and MCKIM do not agree with the principle of wound suture. They make certain by further incisions that the wound tissues are relaxed—especially the fasciæ—and after being lined with bipp the cavity is firmly packed with gauze soaked in liquid paraffin and containing a little more bipp. If it is a limb that is wounded it is either splinted or encased in plaster. A remarkable feature has been the absence of sinuses and the rarity of sequestrum formation in the compound fractures. SAINT [6] has also remarked that little or no sequestration followed in his cases of osteitis thus treated. DOUBLEDAY [7] has recently advocated the use of bipp in injuries and abscesses of the jaw. In this war there has as yet been no report on the late results of the closed-plaster treatment of compound fractures, but when closed plaster was used in Spain D'HARCOURT [8] and others reported that sinuses and sequestra were definite late problems which still required an answer.

There has always been one bogy dangling before the users of bipp—poisoning. Tachycardia, delirium or mental aberration, emaciation and signs of bismuth metallism, such as gingivitis, stomatitis and diarrhœa, have been the main symptoms recorded in cases where bipp poisoning was suspected. Neither MORISON nor GURD and MCKIM, out of thousands of cases, had any deaths that could possibly be attributed to it. It was the misuse of bipp that was responsible for the rare intoxication. The latter record seeing knee-joints packed with bipp, and an empyema cavity filled with 6 ounces of the paste. With bipp properly used the danger of poisoning is remote, but most surgeons urge special care in children. The poisoning symptoms seem nearly always to be due to the bismuth, and gingivitis or stomatitis long precedes any others. Washing out the wound with hydrogen peroxide and giving alkalis, GORDON WATSON [9] points out, ensures an ample margin of safety. Ten years ago CONNELL and BUCHANAN substituted zinc oxide for the bismuth subnitrate and CONNELL [10] claims that in his "zipp" the action of bipp has been retained with no risk of toxic symptoms. He has employed zipp extensively in the tropics and finds that the problems of maggots and smell in wounds treated in plaster are thus overcome. When wounds are plugged with soft paraffin maggots will almost certainly appear in abundance inside the plaster, and although they do no harm (and even good) yet patients justifiably protest. Zipp is now being employed in East Africa and further reports will be of special interest. HOFFMAN [11] has gone further and sought to add an antiseptic punch to the paste by substituting zinc peroxide for bismuth and adding sulphanilamide powder. This he calls "zisp." He claims that zinc peroxide liberates oxygen and thus deals with the

1. Oxford War Primers, London, 1918; *Brit. J. Surg.* 1917, **4**, 659.
2. Chambers, H. and Goldsmith, J. A. *Lancet*, 1917, **1**, 331.
3. Orr-Ewing, J., Scott, J. C. and Gardiner, A. D. *Brit. med. J.* 1941, **1**, 878.
4. Gurd, F. B. and McKim, L. H. *Amer. J. Surg.* 1941, **3** 573.
5. Wright, A. E. Wound Infections, London, 1915.
6. Saint, J. A. *Lancet*, 1937, **1**, 1211, 1263.
7. Doubleday, F. N. *Guy's Hosp. Gaz.* 1941, **45**, 122.
8. D'Harcourt, J., Folch, A. and Oriol, A. *Brit. med. J.* 1940, **1**, 652.
9. Gordon-Watson, C. *Ibid*, 1941, **1**, 211.
10. Connell, W. K. *Lancet*, 1940, **2**, 22.
11. Hoffman, S. J. *Brit. med. J.* 1941, **1**, 785.

anaerobic organisms, but a fair proportion of his cases nevertheless developed gas-gangrene.

The curtain-drainage action of bipp depends on the paraffin being liquid; paraffinum molle must not be used since this will not adhere to the wound walls. This fact should be borne in mind in preparing other applications for packing wounds. Moreover, LOCATELLI and BOWDEN [12] say that sulphanilamide in an ointment base is inert but in liquid paraffin its full bacteriostatic action is sustained. Now that local sulphanilamide is being extensively used it seems therefore that liquid paraffin, or some oil of like consistency, is the rational packing required so as to obtain both the bacteriostatic action of the sulphanilamide and the curtain drainage.

## CARE OF THE TEETH

DENTAL students, like medical ones, are inspecting their world with a view to alteration and redecoration throughout. They have set about it in a mature and workmanlike manner which might be taken as a model for students of all professions; for their Memorandum on the Nation's Dental Services [13] is packed, not with ungrounded enthusiasms or pious hopes, but with solid information obtained by careful inquiry. The committee represents five London dental schools (Guy's, London and King's College and both the special dental hospitals) and is working in coöperation with some dental schools in the provinces. The memo reviews prewar and present conditions in dental education and in dentistry as a public service and as a career. Medical officers of health and school doctors are often enthusiastic about teeth, but otherwise the medical profession has remained curiously apathetic towards public dental services, here shown to be full of serious defects. Nor are the public properly educated in the care of the teeth; those attending dental clinics know quite a lot about fillings, but unfortunately public conservative dentistry in the past fell short of the best standards. Fillings have so often failed that people have become sceptical, and have in many cases reverted to the view that the dentist only exists to extract teeth. Thus the profession is faced with the difficult task of regaining their confidence and re-educating them. Some headway is evidently being made, for the numbers of insured people seeking conservative treatment are beginning to rise. The cost of conservative treatment, however, is often beyond the means of the uninsured, and it is useless, as the committee points out, to train the public to demand good dental treatment unless the dental services are adequate. The care of the teeth should begin before birth with the diet of the expectant mother; it is important that she should be taught this, but it is at least equally important that she should be introduced to the advantages of conservative dentistry before the child is born. In some L.C.C. hospitals all antenatal patients are seen by the dental surgeon and invited to have any necessary treatment; and the Eastman Dental Clinic has a staff of women dental surgeons who treat expectant mothers attending the Royal Free Hospital. These are exceptions, however; in most antenatal clinics there is no routine inspection by a dental surgeon.

The child, before he goes to school, gets little dental supervision beyond that given by the welfare doctor; though at a few welfare centres various degrees of dental treatment have been arranged. At school he is under the care of the school dental service. In 1939, it seems, 69% of the children inspected required treatment, but only two-thirds of these actually received it. In most cases dental inspection is only made once a year, and treatment can only be carried out if the parent consents and brings the child to keep the appointment. Local authorities usually employ only one full-time dental surgeon for 4000–6000 children. The provision is made for the numbers of children ordinarily accepting treatment; thus in a school population of 5000 only about 2300 children might be expected to accept. Good simple treatment can be given by one dentist to about 1450 children yearly; if that number is increased the standard of work suffers proportionately. This has been responsible for much of the unpopularity of conservative work in school dentistry; the parents can scarcely be blamed for refusing it in such circumstances, and that it often is refused is evident from the school reports. In Kent it has been noticed that many parents, though unable to afford private dental treatment for their children, are yet unwilling to take advantage of the clinics; in Holland, Lincolnshire, caries of the temporary teeth is increasing; and one Nottingham mother who had agreed to send her child overseas withdrew him when she was told that dental treatment was essential. Such incidents could have been avoided, perhaps, if the dental profession had resisted from the start any attempt to burden them with more work than they can do with credit. Some local authorities, however, are aware of the inadequacies of their services, and are doing their best to improve them. On leaving school at 14 the child can get no more dental benefit until he becomes eligible under National Health Insurance at 19. Much ill health and unnecessary loss of teeth result from this gap in treatment at a period of life when dental caries is most rife, and a large part of the work of the school dental service is wasted. There is a scheme for dental inspection and treatment of adolescents at Cambridge—apparently the only one in England. Coupled with their fine school service this has an opportunity to do invaluable work.

As things are, 13 million of our people get N.H.I. dental benefit and 5–6 million children and infants are covered by the school and infant-welfare services; this leaves 24 million for whom there is no regular provision of dental treatment by the state. Only a comparatively small proportion of these can afford to pay the full dental fees, yet most dental surgeons serve only this group. The dental register has remained stationary at 14,000–15,000 practitioners for the past fifteen years. The committee estimates that probably about 34½ million people need regular dental treatment, and that even if each of them visited their dentist only once a year, every dentist in the country would have to see at least eight patients a day. There are dental clinics, so-called commercial practices, which cater for the poorer sections of the community; these, run on efficient and economical

12. Locatelli, A. M. and Bowden, S. *Pharmaceut. J.* June 7, 1941, p. 25.
13. Issued by the Joint Planning Committee of Dental Students. Obtainable from the secretary of the committee, Royal Dental Hospital. 1s.

lines and doing work of good quality, are financially very profitable. About seventy large firms provide dental services for their employees. It is significant of the present low standard of public education in the care of the teeth that a relatively small number avail themselves of N.H.I. facilities.

The 15,000 dental practitioners in the United Kingdom vary greatly in the training they have received. The committee sent out questionnaires to 11 English dental schools and received 8 replies. These showed that the average training in modern prosthetic techniques, orthodontics, radiography, anæsthetics, minor oral surgery and conservative dentistry for children is barely sufficient for the demands of good dental practice; and that the standard demanded of the student varies widely. Thus the numbers of dentures which students were required to complete ranged from 6 to 25 in different schools, and the hours spent weekly in conservation work varied between no fixed number of hours, 20 hours enforced, and 27 hours not enforced. In many hospitals there was lack of modern equipment, shortage of tutors and demonstrators, tendency to neglect backward students, and insufficient supervision. In addition the status and training facilities for dental mechanics are said to be poor, and the help that dental students receive from these skilled craftsmen is often inadequate. The committee promises to publish later a final section on planning for post-war dentistry. A remark in their last chapter deserves the attention of our medical planners: "The education of medical students in dental matters is deplorably neglected."

## COOLING DRUGS AND COOLING CENTRES

In the region of the hypothalamus there are centres which exert such a profound influence on temperature regulation that they have been designated the temperature centres. Their identification has stimulated a great deal of research on the physiology of thermal equilibrium and has provided a foundation for hypotheses purporting to explain pyrexia and the mode of action of antipyretics. The centres appear to act as a thermostat which in the human subject is set at about 98·4° F. but permits of a diurnal fluctuation of approximately 1° F. They are themselves sensitive to thermal variations in the fluid that bathes them—if the blood in the carotid artery is made excessively hot the skin reacts as it would to a sharp rise of external temperature. Mechanical irritation of the heat centres in experimental animals also causes a rise of temperature; the thermostat readjusts itself to operate at a higher level. This curious phenomenon made possible the classical experiments of GOTTLIEB on the pharmacology of the antipyretics. He showed that quinine and drugs of the phenazone group abolished this artificial pyrexia, but whereas quinine achieved its effect by depressing tissue metabolism (letting the fire burn low) the newer antipyretics struck at the heat-balancing mechanism; he also showed that these drugs shared with morphine and chloral hydrate a narcotic action on the thermogenic centres, which so upset equilibrium that thermolysis became urgently necessary in order to restore the balance. The loss of heat from the skin under these conditions is so brisk that cooling may be compared to flinging open the windows. The hypotheses of early workers receive corroboration from the fact that direct application of antipyretics to the hypothalamus is even more effective than intravenous administration. It is noteworthy that the antipyretic action of the phenazone group of drugs is seen only when the temperature is raised; they have no action on the normal subject. Such was the rage for antipyretics which prevailed in the closing decades of last century that attention was focused almost exclusively on drugs that produced dramatic effects which could be represented by precipitous curves on temperature charts. Pharmacologists of the time were slow to elaborate the conception of hypothalamic centres governing temperature regulation, but in 1901 HARNACK and his associates showed that picrotoxin, aconitine, veratrine and santonin lowered body temperature in apyrexial animals and they suggested that the action was probably due to stimulation of a cooling centre. The discovery that section of the cervical cord abolished the action of these drugs suggested an anatomical relationship to the other temperature-controlling centres, and it was found that a rise or a fall of temperature could be produced by electrical stimulation of various parts of the hypothalamus. Localisation was carried a step further by the discovery that lesions of the hypothalamus behind the corpora mamillaria produced a fall of temperature. The fact that the cooling action is diminished by hypnotics suggests that the centre responsible shares certain physiological properties with the thermogenic centres. The cooling action is accompanied by a decrease in oxygen consumption and a fall in the metabolic rate. Thus there is a resemblance between the action of quinine in non-malarial pyrexia and the effect of the picrotoxin group of drugs on the normal animal. Whether the resemblance amounts to anything more than a superficial likeness it is difficult to say; but perhaps it would be worth while to investigate the antipyretic action of quinine again from this point of view, using the new technique based on the thermocouple and the string galvanometer for measuring skin temperatures.

Lately ROSENTHAL,[1] working on rabbits, has confirmed that picrotoxin and aconitine, injected into the infundibular region, have a cooling effect on the animal; the fall of temperature amounted to 4·1° C. after 1 μg. of picrotoxin and 5·6° C. after 0·03 μg. of aconitine. The cooling effect of the two drugs injected simultaneously was greater than the algebraic sum of the effect of each. Arguing from observation of the side-effects of aconitine on the heart rhythm and on the electrocardiogram, ROSENTHAL suggested that the simultaneous disturbances of cardiac action are almost certainly due to stimulation of hypothalamic centres, and therefore that the cooling effect of the drug is also attributable to central stimulation rather than paralysis. The grounds for this hypothesis are hardly satisfactory. He mentions the side-effects on the heart as evidence suggesting the site of action of the drug, and anticipates the criticism that even the fall in temperature may be due to a toxic action on the cardiovascular system by stating that even when "no cardiac changes" occurred the body temperature fell considerably. It should be remembered, however, that normal electrocardiograms may be obtained even when cardiac efficiency has

1. Rosenthal, F. E. *J. Pharmacol.* April, 1941, p. 305.

diminished to the point of circulatory collapse. Furthermore, the rapid onset of hyperglycæmia which ROSENTHAL shows as an accompaniment to the fall of temperature after aconitine suggests a sympathetico-mimetic action rather than vagal overactivity; indeed, a fair interpretation of this phenomenon is that the sharp fall of temperature stimulated the adrenal to staunch the flow of radiant heat by means of vaso-constriction, and that the accompanying hyperglycæmia reinforced this mechanism, which aimed at restoring thermal equilibrium. The well-known antagonism between picrotoxin and the barbiturates is illustrated by ROSENTHAL'S experiments; the cooling action of picrotoxin was practically abolished by the simultaneous injection of phenobarbitone. The fact that these two drugs cancel one another out in the pharmacological sense rather than by chemical union is confirmed by the observation that either of them alone is capable of producing a fall of temperature. Moreover, the masking effect of the phenobarbitone on the picrotoxin cooling phenomenon proves that this cooling action must be the result of stimulation of a separate centre and not merely the consequence of paralysis of heat-production centres. One of the dangers of being under the influence of narcotics is that these drugs produce increased susceptibility to changes in temperature in one's surroundings. HERRMANN [2] has shown that sub-hypnotic doses of depressants to the central nervous system, including morphine, pentobarbital and paraldehyde, cause loss of control over temperature regulation; and the toxicity of these drugs was found to be increased by low environmental temperatures. These results, obtained in animals, may have some therapeutic application in the management of patients who are allowed to go about while receiving hypnotic drugs—epileptics, for example, who are taking several grains of phenobarbitone daily. Furthermore, a few years ago we were assured by "the trade" that every sailor knows that rum keeps the cold out, and pharmacologists were bewildered by this contradiction to their own teaching. Certainly if HERMANN'S results are applicable to the methane series of narcotics generally rum is more likely to let the cold in, though the sailor with rum inside him may not care either way.

So far the drugs which have been shown to possess this cooling action are also noteworthy for their high toxicity. Picrotoxin is finding its way back into therapeutics merely as an alternative to strychnine in the treatment of barbitone poisoning, but even here the drug is rightly classified among the desperate remedies. Aconitine once enjoyed a considerable reputation as a diaphoretic and antipyretic, but a well-founded prejudice against cold sweats and increasing recognition of its harmful effects led to its abandonment by the physician. In any case, such a drug could hardly be expected to hold its own when aspirin was made available. Perhaps the main value of the recent precise work on cooling drugs is that it justifies a search for new substances—possibly synthetic products—with a pharmacological action on the hypothalamus comparable to that of the picrotoxin group of drugs, and yet having that margin of safety which POULSSON used to call "latitude of therapeutic action."

2. Herrmann, J. B. *Ibid*, June, 1941, p. 130.

## Annotations

### RADIOLOGY AS A CAREER

THE events of the last two years have shifted many medical careers into other channels and have raised doubts about the prospects after the war of this or that branch of medicine. There is however little doubt that there will be a shortage of radiologists unless newly qualified men turn their thoughts now in that direction. The Ministry of Health is prepared to enrol in the Emergency Medical Service radiology house-surgeons at selected hospitals in London and the provinces. Applicants must satisfy the deans of their medical faculties or schools that they intend to take up radiology and are prepared to enter for a diploma in medical radiology at the termination of their course of study. The selected hospitals will be so situated that attendance at courses of instruction will be practicable, and successful applicants will be required to undergo the appropriate course of instruction, paying the necessary fees. Applicants must have held a house appointment at a hospital for at least six months, and preference will be given to those with longer clinical experience. The salary will be at the rate of £200 a year with an additional £100 for board and lodging if the officer is required to live outside the hospital. Applications should be made (through the deans or group officers) to the Director of Establishments, Ministry of Health, Caxton House, London, S.W.1.

### FOUNDATION OF THE NUTRITION SOCIETY

NUTRITION, more than almost any other subject, concerns scientists of widely different training and outlook. The clinician has always been concerned with dietetics, and in the last 25 years he has come to recognise more and more diseases caused by nutritional deficiencies. The study of the digestion, assimilation and metabolism of foodstuffs occupies many physiologists; and biochemists are engaged more on nutritional problems than on any other single branch of their science. Economists, sociologists, public-health officials, agriculturists and chemists too are all deeply concerned with the science of nutrition, but there has hitherto been no common meeting ground for discussion. Even the Biochemical and Physiological Societies and the nutrition panel of the Society of Chemical Industry include only a minority of those who are interested in nutrition. Before this war workers engaged on nutritional research had often discussed the desirability of founding a scientific society that would embrace all who had a genuine interest in the various branches of the subject. A year ago an informal group composed of about twenty representatives of the main laboratories working on nutrition started to meet about once a month. But it soon became apparent that even in war-time it was desirable to have meetings that were more formal and had a much larger attendance. Representatives of the institutes interested therefore met at the Royal Institution and decided to form the Nutrition Society, with the following provisional committee: Sir John Orr, M.D., F.R.S., Rowett Research Institute (chairman); John Hammond, F.R.S., School of Agriculture, Cambridge (vice-chairman); Leslie Harris, D.Sc., Nutritional Laboratory, Cambridge (hon. secretary); A. L. Bacharach, Glaxo Ltd. (hon. treasurer; Harriette Chick, D.Sc., Lister Institute; Ethel M. Cruickshank, Ph.D., School of Agriculture, Cambridge; H. H. Green, D.Sc., Veterinary Laboratory, Weybridge; Prof. H.P. Himsworth, M.D., University College Hospital; Prof. A. St. G. Huggett, M.B., St. Mary's Hospital; Franklin Kidd, D.Sc., Food Investigation Board; S. K. Kon, D.Sc., National Institute for Research in Dairying; B. S. Platt, M.B., Medical Research Council; H. M. Sinclair, D.M., Department of Biochemistry, Oxford. About 230 scientists who are or have been working on nutrition have been invited to become original members;

this number includes about 50 medical men and women. During the war the society will hold meetings for the discussion of specific topics at various research institutes, and the first meeting is to be held at Cambridge on Oct. 18, when the subject for discussion will be "The Evaluation of Nutritional Status." The meeting starts at 11 A.M. with an introductory address by Sir Gowland Hopkins. This is followed by Drs. Harris, Sinclair, John Yudkin and G. W. Robertson on "Assessment of the level of nutrition in man"; Dr. Platt, Dr. R. H. Dobbs, and Mr. W. C. W. Nixon on "Clinical signs of dietary deficiency"; Drs. C. Crowther, Green and Hammond on "Nutrition of farm animals"; and then an open discussion.

It has been difficult in the past for the clinician to keep in touch with the advances made by the biochemist, and the agriculturist planning production has rarely been in direct contact with the dietitian who knows the community's needs. This new society will bring them together in the same room.

## ELECTROLYTIC SODIUM HYPOCHLORITE

IN the treatment of wounds and burns by the envelope method, Bunyan[1] used sodium hypochlorite prepared by the electrolysis of brine in preference to Dakin's solution or eusol. Carey[2] has described a simple apparatus by which the dispensaries of the smallest hospitals could prepare the solution. A platinum wire and a carbon rod serve as electrodes. The electrolyte is cooled by passing a stream of cold water through a piece of glass tubing suitably bent. Failure to prevent the solution heating leads to formation of sodium chlorate. The solution used is 18% sodium chloride in water. Electrolysis sets free chlorine at the anode and sodium at the cathode. The sodium reacts with water immediately to form sodium hydroxide which in turn reacts with the chlorine liberated at the anode, forming sodium hypochlorite and sodium chloride. The process is continued until about 1% sodium hypochlorite is present. If the solution is then diluted twenty times an isotonic fluid results. Continuous current must be used; Carey used a trickle charger giving a potential of 12 volts and a maximum output of 1 ampere but this was rather slow. The yield depends on the amperage, and the reaction can be speeded up by using a higher voltage. The only limit is that set by the heating of the solution, which is also proportional to the amperage.

## THE RICKETTSIASES

ANYONE who tries to classify and describe the many diseases now known to be caused by rickettsias must face the fact that there are still gaps in our knowledge of their ætiology, pathology and immunology, though on the clinical side there is a fairly broad basis of substantial fact. An attempt to summarise the present position has been made by Blumer.[3] The rickettsias are a widely distributed group of organisms primarily occurring in insects; possibly they may represent bacteria modified by generations of existence in insects, although it must be remembered that insects are also parasitised by true bacteria which show no similarity to the rickettsias. Some include the agents of psittacosis, trachoma, inclusion conjunctivitis, lymphogranuloma venereum and conjunctivitis in cattle, sheep, pigs and pigeons among the rickettsias, but at present it seems better to regard these organisms as viruses, for though they have certain morphological and tinctorial similarities to rickettsias there is no evidence that they are in any way associated with insects. Some of the rickettsias are pathogenic to man, to their insect hosts and to susceptible animals, while others are apparently harmless symbionts. Blumer points out that there are many similarities between the rickettsiases seen in man and animals. Thus all rickettsial infections are transmitted through vectors—lice, ticks, larval mites or fleas. A given rickettsia, however, may be transmitted by more than one genus of vectors or by different vectors of the same genus. In some rickettsiases there is a primary lesion at the point of inoculation; this is true of fièvre boutonneuse, South African tick-bite fever and Japanese river fever or tsutsugamushi disease but not of others. All the rickettsiases tend to present clinical resemblances in a sudden and often severe onset, a tendency to terminate by crisis, sometimes skin eruptions of a hæmorrhagic type and often involvement of the central nervous system. Recent observations suggest that many rickettsial infections involve the lungs setting up a pneumonitis or interstitial pneumonia. The essential pathological feature common to all rickettsiases is an involvement of endothelial cells. In the blood-vessels this involvement causes proliferative and degenerative changes that are chiefly responsible for the skin eruptions and hæmorrhages as well as for the changes in the central nervous system. It is curious that despite the frequency of typhus epidemics there is still no agreement as to the leucocyte changes in this disease, though there is evidence to show that a polymorphonuclear leucocytosis is more common than in any virus infection. In one important point exanthematic typhus shows a similarity to many virus diseases—in the occurrence of inapparent infections. In a Belgrade epidemic it was found that the serum of 13% of a group of apparently healthy people gave a positive Weil-Felix reaction in dilutions ranging from 1 : 100 to 1 : 800, and only one of the group had previously suffered from clinical typhus fever. The blood of some of them was still infectious for guineapigs.

## OSTEOMYELITIS OF THE SPINE

Lannelongue[1] first described a case of osteomyelitis of the spine in 1879, but the difficulties of diagnosis and treatment have yet to be overcome. Three main clinical types have been described according to the degree of virulence of the disease process. In the fulminating cases the picture of septicæmia is uppermost, local signs being masked by the severity of the general symptoms. Blood-culture is almost always positive, and few reported cases have recovered. The subacute type is marked by early abscess formation in addition to the general signs of infection, and symptoms referable to the affected vertebræ are usually evident. Symptoms suggestive of an infection of the urinary tract are constantly seen when the dorso-lumbar region is affected, and may give rise to errors in diagnosis. Bony changes on X-ray examination are not seen until the third week, although radiography may be of value in disclosing deeply lying abscesses as early as the seventh day of the disease. The chronic type is more rare, but is of particular importance owing to the danger of confusion with Pott's disease. In differentiation age, rate of progress and the radiological appearances will help. Osteomyelitis mainly affects adults, tuberculous caries mainly children; even in the chronic type osteomyelitis progresses more rapidly than tuberculosis; radiologically, osteomyelitis destroys the intervertebral disc earlier and spreads more quickly to the adjacent vertebræ. Regeneration of bone is seen during the healing stage of tuberculosis, but this is more definite in osteomyelitis and usually goes on to new bone formation and even bony union. The three types of osteomyelitis were clearly differentiated by Butler, Blusger and Perry,[2] who described a case which was unaffected by sulphapyridine but steadily improved on sulphathiazole. Holmberg[3] has described seven cases,

1. Bunyan, J. *Brit. med. J.* 1941, 2, 1.
2. Carey, J. *Pharmaceut. J.* Aug. 23, 1941, p. 68.
3. Blumer, G. Nelson Loose-leaf Medicine, New York. 1941. Vol. I. Renewal pages 191 to 202S.

1. Lannelongue, O.-M. Acute Osteomyelitis during the Period of Growth, Paris, 1879.
2. Butler, E. C. B., Blusger, I. N., and Perry, K. *Lancet*, 1941, 1 480.
3. Holmberg, L. *Acta chir. scand.* 1941, 84, 479.

one of which he suggests was influenzal. He maintains that the rarity of osteomyelitis in the vertebræ when compared with the long bones is due to a local immunity of the vertebral red bone marrow. He points out that a focus of infection is often present and mentions that Fraenkel demonstrated bacteria in some patients who had died from infections although there had been no local symptoms during life. Apart from chemotherapy, whose value in this condition has yet to be confirmed, treatment consists of immobilisation in a plaster bed or jacket in the later stages, with drainage of abscesses and (rarely) with removal of free sequestra.

## GROWTH OF THE OVARIAN FOLLICLE

As follicles grow they first sink into the ovary, and as they increase in size and develop thecæ and an antrum they move again to the surface. According to Strassman,[1] who has published a full account of his laborious research on follicular growth, the downward growth of the small follicle is due to the lesser resistance of the interior of the ovary as compared with the ovarian cortex. On the other hand the return of the follicle to the surface is due to eccentric growth of the theca interna, which develops a thick growing cone, overlaid by a thin and non-resistant layer of theca externa, towards the surface of the ovary. On the opposite pole of the follicle the theca interna is thinner but is overlaid by a thicker theca externa. The theca interna cone has a definite tropism to the nearest point of the ovarian surface; the granulosa cells can push their way more easily among the soft cortical cells than they can towards the deeper parts of the ovary. This conception of the way in which the follicle moves is different from older views which related the return of the follicle to the ovarian surface purely to mechanical growth. It will be interesting to discover whether the theca interna also plays an active rôle in ovulation, rather than the passive one which is generally ascribed to it.

## PLANTAR RESPONSE IN HEALTHY INFANTS

THERE are said to be seventy articles in eight languages on the plantar response in infants, but Dr. Myrtle McGraw[2] of New York has usefully made the number seventy-one in a study of 75 normal children ranging from the newborn to the five-year-old. Repeated examinations were made at monthly or longer intervals and records of 1011 observations were obtained, of which 74 were on motion-picture film and 937 were written protocols. The stimulus consisted of a light stroke with a toothpick along the lateral aspect of the sole and across the metatarsal arch to a point proximal to the great toe. Notes were made of the reactions observed, including movements of the leg as well as flexion and extension of the toes. The types of response elicited could be broadly divided into three groups. In the younger children, and characteristic of the first four months of life, was the mass-reflex. Here dorsiflexion of the toes is accompanied by movements of the entire leg—contraction of the flexor muscles at the hip, knee and ankle as well as dorsiflexion of the toes. The most consistent part of the response is a sudden, total withdrawal of the whole extremity. Next comes the transition phase: the speed of withdrawal is diminished and consists principally of an abductor response of the leg. Plantar flexion of the toes is more common, although there is considerable variation in the movement of the toes and the great toe. This transition phase develops slowly and is predominant by the end of the first year. The third phase, termed the "segmental reflex phase," was common to all the children after the age of two and a half years. The response to plantar stimulation becomes increasingly restricted until it consists of movements of the ankle and toes only. Ankle movements are flexion, inversion and eversion, and the common response of the toes is plantar flexion, movements being much slower than those characteristic of the mass reflex. In a few children the type of plantar response was correlated with the development of erect locomotion, and in 26 out of 33 the onset of the third phase, the segmental reflex phase, occurred about the time of deliberate walking. Although in most children this third phase had been reached by three and a half years, dorsiflexion of the toes was elicited occasionally as late as four or five years. In these later age-groups, however, such extensor responses were not accompanied by the mass withdrawal reaction characteristic of the newborn infant.

1. Strassman, E. *Amer. J. Obstet. Gynec.* March, 1941, p. 363.
2. *Amer. J. Dis. Child.* June, 1941, p. 1215.

## SYPHILIS OF THE LUNG

THE clinical diagnosis of acquired pulmonary syphilis is never easily made. This is due partly to the propensity of syphilis to mimic other conditions and partly to the rarity with which treponemata can be demonstrated before and after death. Pulmonary manifestations are unusual in the secondary stage. When they do occur they resemble, in the bronchial mucous membrane, the lesions found higher in the respiratory tract; a lobar pneumonic form has also been described at this stage. It is, however, in the tertiary stage that the parenchyma of the lung is most often involved and the standard works on respiratory medicine portray distinct pathological guises in which the infection appears. Pneumonia (sometimes with a lobar distribution), an indurative or fibrotic form, and gummata either large or miliary are all recognised. Pearson and De Navasquez,[1] from personal observations and a study of the literature, have lately sought to harmonise these multiple manifestations into the changing sequence of a single process. They regard an acute interstitial pneumonia as the starting-point; this may organise to produce a diffuse sclerosis or may undergo necrosis with gumma formation. The differences encountered, therefore, become one of degree and of time rather than of a fundamental type of reaction. They view the whole process of parenchymatous pulmonary syphilis as dependent on a disease in the mediastinum, and of all the organs that can act as a pivot point the aorta takes pride of place. Thus Carrera[2] found syphilitic infection in the heart and aorta of all the 12 cases of lung syphilis that he studied and the same was true of the case reported by Pearson and De Navasquez. The association is too constant to be solely due to chance, even when allowance is made for the high incidence of aortitis in syphilis, and it is now becoming axiomatic that the diagnosis of pulmonary syphilis, either during life or after death, is open to question unless there is found, in addition, reasonable evidence of specific aortitis or of aneurysm. The criteria for the successful clinical recognition of parenchymatous pulmonary manifestations of acquired tertiary syphilis can be summarised thus: (1) an anomalous history of pulmonary disease that may be brief or may be measured in months or even years; (2) the exclusion, by recognised methods, of other causes for the lesion, especially tuberculosis; (3) the presence of syphilis in other organs or the stigmata of past infection; (4) positive serological findings; (5) a ready response to antisyphilitic treatment particularly when revealed by serial radiograms; and (6) evidence of mediastinal disease, especially aortitis and aneurysm. Appraisal of all the evidence in the light of these points will do much to prevent the diagnosis of lung syphilis from resting on an insecure foundation; conversely, Dr. Clark's case reported in this issue comes as a reminder of how sometimes the spirochætal origin of an obscure pulmonary illness can confidently be inferred.

1. Pearson, R. S. B. and De Navasquez, S. *Guy's Hosp. Rep.* 1938, 88, 1.
2. Carrera, J. L. *Amer. J. Syph.* 1920, 4, 1.

# In England Now

*A Running Commentary by Peripatetic Correspondents*

THERE must be quite a number of people who move in circles far higher than I have ever had hopes or wishes of attaining who get a lot of quiet fun out of the present Anglo-Soviet accord. Some of us humbler ones have for many years tried to persuade our fellows that the inhabitants of the U.S.S.R. were not barbarians. We had tried to disillusion those of our colleagues who clung to the belief that savages with whiskers, blouses and top-boots, bloody in deeds and crude in ideals, were the rulers of the real U.S.S.R. We had tried to tell our fellow-workers in science and medicine that we did ill service to our calling in closing our minds to the remarkable contributions to knowledge made by the workers in the Soviet Republics. Now, I and those others who have striven to obtain some recognition for the Russian contributions to science, to medicine, to art and literature have the laugh of our fellows. It is almost pathetic to follow the painful efforts of our journals to fall into line in an inglorious unanimity for praising Russian scientific achievements. But to one who has striven in the days of that stupid blindness of British orthodox outlook towards these things, the whole business seems pitiful beyond the last dreams of cynicism. It is not a laugh that one gets from these reflections—it is a heart-wrung tear and a soul-felt prayer. Are we all so small that, because some of us by background, traditions, possessions or privileges disliked the Russian political regime, we fancied we could despise the scientific advances made by these people? Surely the world has been disillusioned by now. That the military organisation of the U.S.S.R. has surprised our wretched Blimps by its efficiency in warfare is a small thing. To surprise a Blimp is a trivial attainment. But that science, in the person of thousands of British scientific workers should be surprised, now that it has come to realise the advances made in the Soviet Union, is surely a matter for regret. It is a pitiful satisfaction to indulge in that lowest form of asserting one's justification by saying "I told you so": but at times it is difficult to avoid doing it.

* * *

Cecil Houses—only three now instead of five—have held by their bargain: women still find there tea and bread-and-butter night and morning, a clean bed, a hot bath, facilities for washing clothes and the use of a warm gay sitting-room, for a shilling a night with no questions asked. But for the first time since the original house was opened in 1927 the trust has ended up the year with a balance on the wrong side. Once the foundation costs are paid the houses are normally self-supporting; but nowadays rates, gas, light, fuel and provisions have all risen in cost; blackout materials have been a recurrent expense as blast and broken glass take their toll of them. The show house in Boswell Street was an air-raid casualty and has had to be closed until reconditioning is possible. The Kensal Road house is not easily reached in the blackout; the women hesitated to cross the dark canal bridge, and the reduction in numbers made running costs too heavy to keep open. It has been rented to the Ministry of Pensions during the war. The remaining three houses, though knocked about, have been able to carry on in spite of adventures in which they lacked gas, water and light, or contended with broken windows. No-one was hurt in these raids, but first-aid repairs to the houses have been costly.

Yet the houses are needed more urgently than ever. They provide for many women their only security, and in the circumstances it has become impossible to restrict the time each one stays. Some have settled in as permanent guests, ensuring their lodging for 7*s.* a week; others are temporary guests seeking lodgings between jobs, or women staying in London to catch sight of relations or friends in the forces as they pass through; others are themselves on leave from the Services. Nearly all are in work; they come back in the evening to cook their meals in the communal kitchen and exchange gossip of the day's doings before adjourning to share the sitting-room fire or—the younger ones—to enjoy dancing and music in a downstairs room. Before the war the houses were shut during the day, but now this regulation is relaxed; the houses are open in daytime, and those on leave can rest or read there. A fund is kept for those who cannot afford to pay the shilling, but it is rarely drawn upon; and there is a wardrobe for fitting out those who need them with clothing, hats and shoes. Women can bring their young children, paying 3*d.* for a cot beside the bed; mothers and children occupy a separate dormitory, so that a crying child will not disturb the other guests.

To prevent the danger of spread of vermin or disease the beds are inspected every morning; if vermin or traces suggesting disease are found, bed and bedding are sent to a disinfecting station. The occupant of the bed, next time she comes, is taken aside and asked in the first case, whether she is willing to go to a cleansing station, and in the second whether she will attend a doctor free of charge. She rarely declines but if she does it is explained to her that she cannot be admitted because of the danger to other lodgers.

* * *

The worst thing about Army doctoring is the little medicine in it. The work of an R.M.O. is invaluable and it couldn't be done by anyone else; but professionally it's unstimulating routine and clinically it hardly exists. Men must be kept healthy: if they misbehave by becoming sick off they go to hospital. In civil life the "diagnosis, ill; treatment, hospital" sort of practice was exceptional. In the Army, and for the best of military reasons, it is the rule. Now, the prevention of disease and promotion of health is a fine philosophy, and one to which I fully subscribe. Until the Golden Age arrives, however, it will still be useful for doctors to know quite a lot of medicine. Many of us in the Army, it seems to me, are in danger of disuse atrophy, of becoming stale and rusty, of forgetting the little that was acquired at such great pain, of finding ourselves on demobilisation with a necessary job done but worse doctors than we were on enlistment. This is a problem that wants tackling, and not by cosy planning but straightaway. Postgraduate education has never been a highlight of British medicine; it was never so badly needed as now. The answer seems obvious. In this country the hospital is the centre of medical education. Although this is strictly speaking not a military responsibility at all, the military hospital could take over this function for the military doctors and district it serves. Clinical meetings are already fairly common though there is plenty of room for expansion. Much more to the point, one hospital I know of organises regular week-end schools. The specialists do their stuff and the local M.O.s at the least enjoy it. Half lecture, half clinical, the two days are packed with streptococcal fevers, resuscitation, eyes, feet, vitamins, Vincent's angina, effort intolerance, mental deficiency, gas, oxygen, running ears, scabies, and so on. There's not much time for digestion in this rather Stakhanovite sort of effort but that happens afterwards, it is hoped. Schools like this, and on a larger scale, would be a great help.

The Army Medical Department itself issues excellent bulletins and leaflets from time to time, and courses are organised on many military subjects. Why not on just ordinary medicine and surgery? And run perhaps by the universities on the lines of the "intensive" weeks at Hammersmith? Of course everyone concerned is terribly busy. . . . Probably the most useful measures of all would be a wider sharing of G.D.O. appointments at the hospitals and part-time attachments to the hospitals. But these involve all sorts of issues on which I haven't the knowledge to speak.

* * *

Twice I have decided that this war really has gone on long enough—once on the awful morning when there was no marmalade for breakfast, and again at the week-end when the family joint was beef and there was no mustard. Being bombed in one's hospital or being called out as a member of a mobile unit to attend to air-raid casualties was all in the day's work and somehow rather impersonal; but these other matters brought the war very near home. Fortunately neither crisis lasted long; marmalade reappeared next morning and the mustard shortage was definitely overcompensated, since within a week our maid had produced a small tin, my grateful grocer patient a large tin and my sister turned up on leave with yet another large one.

This "grateful patient" of mine rather worries me. I had not seen him since well before the war, indeed I

had forgotten all about him till the other week when one of these minor food crises which are continually cropping up reminded me of him. I hesitated a long time. Could I really have the brass neck to call on him, inquire after his health and gradually lead up to the major question of whether he could help me? In the end the domestic shortage of biscuits won the day—I took the plunge and the next time I was in his neighbourhood boldly entered his shop. I am sure he saw through me at once, but he played his part like a gentleman, and a weekly call now seems part of the routine of a visit to town. The result is that I am never so popular at home as on the day of my London visit, whence I now return with a medley of biscuits, jellies, tinned fruit blancmanges or lime juice—all those little extras utterly unessential to life but so delectable to the palate of a child. Actually my youngsters do not do too badly, as I usually manage to produce a weekly ration of chocolate from the enterprising steward of one of my hospitals who keeps a secret, if small, store of confectionery.

Another minor shortage which is threatening to modify our social habits is the scarcity of sherry. I must confess to a certain disappointment when twice within a week I was invited out to dinner and both times had to sit down to a completely teetotal meal, and when this was followed by an invitation to coffee, because "sherry is so difficult to get these days," I felt that life really was becoming rather hard. But when I tackled my own wine merchant he said he could let any of his customers have half a dozen bottles of sherry a week, and if any *Lancet* reader has the price of half a dozen I will reveal his name. I shall expect a non-teetotal dinner in return.

* * *

There have been a lot of letters in the *Lancet* lately about the treatment of venereal diseases in the Forces. It is all very well the military saying that opportunities are given for treatment, when necessary even by doctors who are not in uniform in establishments administered by civilian authorities. I know that most commanding officers do their best for their men, but there is still the idea that a man with v.d. is a defaulter. There is no point in arguing about this; it is certain that he is also sick and that to deprive a man with gonorrhœa of his treatment because his unit is going on manœuvres is not only unfair to the man but military shortsightedness, for it may lead to his permanent invalidism and loss from his unit. If the military really think (which I don't) that punishment has a prophylactic effect let it be given when he is cured and let his cure be expedited in every way.

There is another side to the question which seems to be almost completely neglected. There are concentrations of men in isolated rural districts which have only a very rudimentary public-health service. The soldiers get their treatment (and perhaps their punishment) without difficulty. In the case of their contacts the situation is reversed. The incidence of untreated female v.d. in certain rural districts is truly horrifying. It may be said that medical men as scientists have no business to be horrified, but what horrifies me is the attitude of local health authorities which refuse to recognise the very existence of the problem.

* * *

My wife has remarked that it's all very well my being high falutin' but what about infant's food. Admittedly we have an allergic daughter (Freud never explained why doctor's daughters are allergic) but the difficulty today in obtaining any artificial baby-food seems disproportionate. No doubt brands of artificial food are more numerous than the physiological needs of infants demand, but something should be done to standardise the position. There are times when we cannot buy any brand of cereal food in a market town of 12,000 inhabitants for a year-old child. Surely the manufacturers could agree among themselves and produce several standard products suiting various age-groups and requirements and thus remove at one blow present distribution difficulties and the artificial complexity of an advertisement-controlled market. While we are on this subject, why should not oranges be only purchasable on production of an infant's ration card? That would do more good to our war effort than using them as a diluent for gin in an A.T.S. subaltern's cocktail at a Thames-side inn. Yes, I can hear you asking what I was doing there. The answer is that I would'nt drink a Bronx if you stood me one. I like my alcohol recognisable.

# Parliament

## FOOD PRODUCTION AND DISTRIBUTION

CONVERSATIONS everywhere in England now turn often and eagerly to food. Our legislators also take at least an administrative interest in the topic for last week it was the subject of debate in both houses. In the Lords on Sept. 30 Viscount BLEDISLOE took as the text of his appeal for more feeding-stuffs for livestock the I.C.I. bulletin (No. 3) on "Home Production and Use of Feeding Stuffs in War." He asked whether the Government were in general agreement with its arguments and deductions; and whether in the light of them they contemplated amending their estimate of the number of livestock, especially poultry, we could maintain.

The bulletin urges that the Government's plans extend our acreage under wheat at the expense of crops grown for livestock, with an inevitable shrinkage of the stock and their products. Lord TEVIOT commended the words of Dr. Norman Wright [1] to the Government and urged that farmers should be allowed to keep at least 10% of their wheat for their animals.

Lord DAWSON said that experts did not always speak with a single voice and that he thought the Minister of Food, acting on misleading data, had over-penalised the hen, since it was a competitor for human food. But the intensive hen was a very remarkable creature, producing 180 eggs a year, and second only to the cow as a converter of feeding-stuff. Milk and eggs were a very tower of nutrition strength and especially useful in the preparation of light foods for workers beginning to get weary in mind and weak in their digestions. It was right that children and invalids should have priority but we also needed eggs to keep our active population fit and well, and housewives, a forcible group when they got going, were demanding that the production of the egg, an important appanage of their homes, should be maintained. It was important, Lord Dawson continued, that we should produce protein-rich food for our animals and hens, not next year, but within the next two or three months. In the manufacture of acetone there was a by-product containing large quantities of protein which had been used to feed pigs and other animals in the last war, but at present was being wasted. There was also a synthesised protein of high value, made in part of dried yeast, which, he believed, was ripe for manufacture on a large scale. He urged the Ministry of Food to hustle this on. Trial was being made with sheep cheese, and a higher nutrition value was to be obtained from the ewe in terms of cheese than in terms of mutton. Lord Dawson also pleaded that tuberculin-tested herds should be protected. Certain food officers did not seem to realise that these cows had been gathered together for years past and if anything happened to the herds it would take years to undo the evil. Yet an order had been issued to reduce the quantity of tuberculin-tested milk by 200 gallons a week by Oct. 18. It was ironical for such a thing to happen when concern was being felt at the increased incidence of tuberculosis, and he felt there must be some mistake. We should endeavour to stay the down-grade process in the production of milk, for production is like virtue. It is easy to make a reputation, still more easy to lose it, and once lost it takes a long time to rebuild. The Marquess of CREWE declared that the Ministry of Food was an expedient, not an institution, but that manure was the pivot of British agriculture.

The Duke of NORFOLK in his reply said that the Government was in agreement with the arguments but not the deductions of the I.C.I. pamphlet. It was true that we could not live by bread alone, but it was also true that we could not live by meat and eggs alone. Lord BLEDISLOE, while not pretending to be wholly satisfied, agreed to withdraw the motion.

The debate in the House of Commons on Oct. 2 dealt with the distribution of our food and Mr. JAMES GRIFFITHS made a strong plea for extra food rations for miners, quarrymen, railwaymen, and for women entering factory life for the first time. He spoke for the workers and said, "Give us the food and we will do the job." Prof. A. V. HILL gave scientific support and emphasised that vitamins could not replace energy in the diet of heavy workers. The science of nutrition must not be

1. See *Lancet*, Sept. 27, 1941, p. 373.

invoked to cover up Ministerial deficiencies by unintelligent uniformity. Major LLOYD GEORGE heartened the House by his sympathetic and cheering reply. From Nov. 17, he said, the domestic fat ration will be increased temporarily from 8 oz. to 10 oz. per week and the sugar ration from 8 oz. to 12 oz. He hoped the dried fruit position would be much better. He wanted to encourage the provision of canteens for heavy workers and to allocate to them substantially increased quantities of some food. Catering establishments for essential workers would be treated in the same way. In the heavy industry canteens it was hoped to double the meat ration and to treble the sugar allocation. In trades where the work was not so heavy, meat allocation would be increased by a half and the sugar allocation doubled. He hoped also to make available increased supplies of bacon and ham, cooking fats, processed eggs, and cheese.

Sir E. GRAHAM-LITTLE said the diet of the heavy worker was better a hundred years ago when he had eaten wholemeal bread, milk and green vegetables instead of meat and white bread. He could not understand why the Government did not make our national wholemeal loaf compulsory. Today it is not even in general supply. Dr. EDITH SUMMERSKILL thought it was unfortunate that malnutrition was not accompanied by a rash and reminded the Minister of Food of the increase in tuberculosis among young women. She pointed out that the expectant mother is expected to sustain two lives on one ration.

### Plans for Tomorrow

Speaking in the debate on the war situation Dr. HADEN GUEST said that the problems of the future were already reaching back to us in the present. One tremendous problem would be health in Europe and in this country. So far our health had been good but the report on public health in Scotland and other information showed that war conditions had caused an increase in tuberculosis. Our rationing and living and working conditions were good, yet in Glasgow there was an increase of 10% in tuberculosis due to the strain of war which would be multiplied in Europe and in the Soviet Union. Dr. Guest acclaimed the plans made at the conference of allied nations to send help and food to Europe as soon as hostilities stopped, but felt that Parliament might in principle go a little further. It would give heart to all people of good feeling if we began now to make plans on a world-wide scale to deal with the world health at the end of the war.

### Wives without Children

On Sept. 30 Captain C. C. POOLE asked the Secretary of State for War whether he was aware of the poverty and hardship suffered by many wives and children of members of the Forces, and why these dependants were placed in a less favourable position than the dependants of those who remain in industry. Sir ROBERT GOWER also asked him if he was aware that experienced social workers reported that numbers of families of serving men find it impossible to manage on the present scale. Captain MARGESSON referred both members to the PRIME MINISTER'S reply to another question when he said that, while the recent revision of family allowances of junior officers was the first general improvement in the emoluments of officers since before the war, the family allowances of other ranks had been improved several times since that date and the pay of all N.C.O.s and men increased last year by 6*d*. a day war pay. But he was examining the suggestion that some of the families of other ranks are experiencing hardship and difficulty and he would make a further statement as soon as possible.

In this parliamentary backchat the emphasis is rightly laid on the family, for it is the soldier's wife with a brood of children who is having the hardest time today. Even with schools and day-nurseries it is difficult for her to get really remunerative work, and yet give her children the care and attention they need. But the wife without children can supplement her allowance with a well-paid job—indeed the Government is anxious that she shall volunteer to help build a spitfire or a tank. Or she may join one of the women's services, where she not only gets her board, lodging, and pay but also receives an allowance, contributed jointly by her husband and the Government. With plenty of work for everyone and not enough money to give as much as we would like to the soldier's children should we not think again about the distribution of our pennies and consider making motherhood and not marriage the qualification for an allowance?

## QUESTION TIME

### Medical Advisory Committees

In answer to a question from Sir ERNEST GRAHAM-LITTLE the Minister of Health said that none of the members of his medical advisory committees receives remuneration for their services. Their membership is as follows:—

*Central Medical War Committee.*—H. S. Souttar, F.R.C.S. (chairman); H. Guy Dain, M.B.; J. W. Bone, M.B.; H. W. Pooler, M.B.; Colonel A. H. Proctor, M.D.; Prof. R. M. F. Picken, M.B.; W. E. Thomas, L.R.C.P.E.; E. A. Gregg, L.R.C.P.I.; D. G. Greenfield, F.R.C.S.; P. Macdonald, M.D.; J. C. Matthews, M.D.; Prof. A. H. Burgess, F.R.C.S.; J. A. Brown, M.D.; G. E. Elkington, F.R.C.S.; F. W. Grant, L.R.C.P.E.; F. Gray, M.B.; J. M. Johnstone, M.B.; Sir Kaye Le Fleming, M.D.; S. A. Winstanley, M.B.; Charles Newman, M.D.; Sir Charles Wilson, P.R.C.P.; Sir Girling Ball, F.R.C.S.; Sir Alfred Webb-Johnson, P.R.C.S.; Prof. W. Fletcher Shaw, P.R.C.O.G.; T. G. H. Shore, M.D.; Russell J. Reynolds, M.B.; D. Embleton, M.B.; J. D. M. Cardell, F.R.C.S.; A. A. W. Petrie, M.D.; C. B. Heald, M.D.; Prof. Harry Platt, M.S.; G. Lilico, M.B.; Janet Aitken, M.D.; Sir Francis Fremantle, M.D.; Z. Mennell, M.B.; P. N. Panton, M.B.; J. Alison Glover, M.D.; Sir Hubert Bond, M.D.; R. W. Craig, M.D.; Prof. Sydney Smith, M.D.; and F. M. B. Allen, M.D.

*Emergency Hospital Medical Service Committee.*—Sir Robert Hutchison, M.D. (chairman); Colonel H. Letheby Tidy, M.D.; Sir Hugh Lett, F.R.C.S.; Sir Alfred Webb-Johnson; Prof. W. Fletcher Shaw; J. P. Hedley, F.R.C.O.G.; H. S. Souttar; F. Gray, M.B.; Charles Newman; Prof. Picken; Sir Girling Ball; H. E. A. Boldero, D.M.; Sir Charles Wilson; Prof. Burgess; K. W. Monsarrat, M.B.; Prof. L. G. Parsons, M.D.; W. Allen Daley, M.D.; Sir Maurice Cassidy, M.D.; R. M. Vick, F.R.C.S.; R. St. L. Brockman, F.R.C.S.; F. W. Grant; and T. H. G. Shore, M.D.

*Committee on Physical Medicine.*—Sir Robert Stanton Woods, M.D. (chairman); C. W. Buckley, M.D.; Sir Henry Gauvain, F.R.C.S.; F. S. Cooksey, M.D.; E. J. Crisp, M.B.; J. Cowan, M.B.; and J. G. Johnstone, M.B.

*Committee on Rehabilitation.*—Prof. F. R. Fraser, M.D. (chairman); R. I. Stirling, F.R.C.S.; J. F. E. Prideaux, M.R.C.S.; H. A. T. Fairbank, F.R.C.S.; Sir Robert Stanton Woods; G. Riddoch, F.R.C.P.; H. E. Griffiths, M.S.; J. Rhaiadr Jones; Lord Dawson, M.D.; Bernard Hart, M.D.; Gordon Holmes, M.D.; and Prof. G. Jefferson, F.R.C.S.

*Committee on Tuberculosis.*—Sir Percival Hartley, M.D. (chairman); J. H. Harley Williams, M.D.; J. B. McDougall, M.D.; D. A. Powell, M.D.; G. T. Hebert, M.D.; N. Lloyd Rusby, B.M.; J. Ferguson, M.B.; W. Allen Daley; and Norman F. Smith, M.D.

*Shelter Health Committee.*—Lord Horder (chairman); Miss Creswick Atkinson, R.R.C.; Sir Wyndham Deedes; R. C. Cox, M.Inst.C.E.; and Colonel P. G. Stock, F.R.C.P.

### C.M.W.C. and Home Guard

Replying to a question Mr. BROWN said that to avoid undue interference with the medical organisation of the locality, Army Council instructions provide that no medical practitioner is to be enrolled in the Home Guard unless previous permission has been given by the local medical war committee. It is open to any practitioner aggrieved by the Committee's decision to communicate with the C.M.W.C. under whose general directions the local committees act. If he is dissatisfied with the conclusion of the central committee and wishes to make representations to me I shall of course be prepared to consider them. There is no representative of the Home Guard as such in the membership of the central committee but an observer attends on behalf of the War Office.

### Medical Man-power

An interim report has been received from the Shakespeare Committee and action is being taken on the recommendations. These include suggestions for the establishment of regional committees to promote the maximum coöperation between civil and service medical establishments, the continued recruitment for the time being of medical officers for the Forces at the rate at which they are now being recruited, the compilation of particulars of bed accommodation and staffing for all civil hospitals and measures to secure greater mobility of resident medical staffs as between one hospital and another. (Mr. BROWN replying to Sir FRANCIS FREMANTLE.)

### Alien Doctors

Under a recent order an alien doctor who fulfils the other necessary conditions may be placed temporarily on the Medical Register if he is to be employed as an assistant to a British doctor in private practice. The employment is in each case subject to the approval of the Home Secretary. (Mr. BROWN replying to Miss E. RATHBONE.)

### Milk in Schools

In answer to a question addressed to the President of the Board of Education, Mr. J. C. EDE stated that in May, 1941,

the number of public elementary school-children in England and Wales receiving milk under the scheme was 2,700,000 compared with approximately 2,100,000 in March, 1940. Including schools other than public elementary schools, it is estimated that in May, 1941, nearly 3,000,000 children were taking milk in school under the scheme.

### Milk for the R.A.F. and Others

Replying to Flight-Lieut. RALPH ETHERTON, who asked whether it was proposed to modify the present nil issue of fresh milk to R.A.F. units, Major LLOYD GEORGE said that the present demand for milk is considerably greater than the estimated production during the winter months and to ensure adequate supplies for mothers, infants, children and invalids, a scheme of controlled distribution will be introduced on Oct. 12 on the lines indicated in his reply of Aug. 6. Adult consumers will receive part of their supplies in the form of condensed milk which will be available in much greater quantities than last winter, and it has been arranged that, save in special circumstances, the supply of milk to the Services shall be in this form.

### Medical Prisoners of War

Mr. D. SANDYS, financial secretary to the War Office, stated that some 500 medical personnel and chaplains are entitled to repatriation under the International Convention of 1929.

### Increase in Tuberculosis

Replying to Dr. E. SUMMERSKILL Mr. BROWN said that he had arranged for a special inquiry to be made, with the assistance of the Medical Research Council, into the causes of the war-time increase in tuberculosis. The latest information available shows that on June 30 there were 1763 persons in England and Wales who had been on local authority waiting-lists for institutional treatment for upwards of 10 days. Arrangements were being made to release some E.M.S. beds, but it was not merely a question of beds, but of nurses.

Answering a further question, from Sir E. GRAHAM-LITTLE, Mr. BROWN gave the following table of female death-rates (per million) from tuberculosis in England and Wales.

| — | Respiratory | | Other forms | |
|---|---|---|---|---|
| | Ages 15–20 | Ages 20–25 | Ages 15–20 | Ages 20–25 |
| 1936 .. | 670 | 1039 | 129 | 97 |
| 1937 .. | 652 | 1029 | 130 | 116 |
| 1938 .. | 605 | 931 | 132 | 93 |
| 1939 .. | 601 | 955 | 137 | 90 |
| 1940* .. | 692 | 1103 | 146 | 132 |

* Provisional, based on the 1939 population.

### Medical Aid for China

Mr. A. EDEN announced that the Government have agreed to make a grant-in-aid of £50,000 to the British Fund for the Relief of Distress in China.

### Annual Reports

Replying to Sir F. FREMANTLE, the Minister of Health stated that the regular series of reports of his department and of his chief medical officer will be suspended till after the war, but a summarised report will probably be ready within the next two months. The President of the Board of Education proposes to defer the annual reports of his chief medical officer until after the war. The Minister of Labour hopes to issue the report of the chief inspector of factories for 1940 within the next three or four weeks.

---

HOSPITAL SURVEY IN BRISTOL AND DISTRICT.—The new Bristol Hospitals Commission is sitting at the Council House, Bristol, Oct. 6–9 to initiate a survey of hospitals, voluntary and municipal, and of teaching services in the area with a view to meeting current needs and the expansion and reconstruction desirable after the war is over. The Lord Mayor has invited local contributory schemes to submit observations to help solve the financial problem of the voluntary hospitals. The commission consists of Sir Farquhar Buzzard, Sir George Martin, Prof. G. E. Gask, Dr. M. T. Morgan, Dr. John Buchan, Dr. J. P. Candler, Dr. A. Q. Wells, Alderman W. Hyde and Mr. S. Clayton Fryers.

## Letters to the Editor

### MEDICAL ASPECTS OF BOXING

SIR,—In an excellent book J. G. Crowther (1940) maintains that one of the outstanding scientists of the last century was Sir Humphry Davy. Davy was the first scholar who "sold science to the industrialists," who applied to a practical purpose a mass of expert information, making available to the people the fruits of a hitherto exclusively academic field of learning. The present state of physical education reminds me of that of British science in the time of Davy, Faraday and Joule. Physical education is one of the youngest children of science, unknown in its scope not only to the general public but to the majority of educated people. There are few whose concept of its medical implications enables them to apply our present knowledge. Physical education and sport are today still based on empiricism, not on scientific information, and many years must elapse before a rational attitude determines our policy.

Of all important branches of physical education, boxing is the only one in which injuries are not accidental events but form the essential aim of the sport. Every boxer tries to disable his adversary by hurting him, preferably through inflicting a head injury of such an intensity as to produce a state of unconsciousness. The fact that the various ring injuries have been dignified by popular terms such as "knock-out," "groggy," "punchdrunk" and others can, of course, not obscure the true picture. This was the essential point I endeavoured to bring out in a book which you have critically reviewed (*Lancet*, June 14, pp. 756, 759) without even mentioning my main argument. In my book I laid stress upon the unavoidability of head injuries being produced in amateur as well as professional boxing fights conducted under "regulation conditions." Ample evidence was presented to the effect that blows to the head, even if they do not lead to the immediate collapse of the fighter, very commonly are followed by serious after-effects; that the chin knock-out is a concussion of the brain notwithstanding the fact that it is caused by a specific traumatic mechanism and that its clinical sequelæ distinguish it in some respects from other forms of concussion.

Surely, Sir, all this is "incontrovertible medical evidence" which, incidentally, has been accepted by leading neurologists, among them Fulton and Hassin, who have expressed their agreement with my views. At a recent Air Force boxing tournament five bouts ended through knock-outs. Three of the unfortunate victims hit the floor with their occiputs while falling to the ground in an unconscious state. I am at a loss to understand how "repeated neuropsychiatric examinations" should be able to make such routine injuries impossible. I challenge any flight surgeon who wishes to tell me that the above mentioned Air Force boxers would not be severely handicapped in the course of their duties during the days following the knock-outs. No logically thinking physician can fail to see the difference between athletic accidents in general which are accepted as unavoidable accompaniments of every manly sport, and the deliberate infliction in the ring of brain injuries, many implications of which we have only recently learned to understand. Against this danger of head injuries other boxing injuries play a much less significant rôle, as my survey has revealed for the first time. The conclusion at which I arrived was clearly stated thus: "The dangers of boxing can only be eliminated by the total abolition of this sport." More especially, I felt it my duty to press for the immediate removal of boxing from the recreational programme of the armed forces.

The evidence on which I base my thesis that boxing must go divides itself into several categories. Primarily I rely on personal experiences and observations as well as the results of experimental and clinical investigations over twelve years. Taking a rather unorthodox view with regard to the extent to which medical information should be applied to practical issues, I have not hesitated to make use of descriptions given by boxers and other non-medical persons. While the quality of such contributions, naturally, varies within wide limits, I agree with Brend (1938) that whenever we deal with a social

problem we are bound to take cognisance of lay views and opinions. For many years I have systematically collected the medical literature on the subject and read it. There is no scarcity of articles on boxing; the value of most of these articles, however, is limited. At the present stage of development of this new branch of medicine efforts must be concentrated on presenting well-studied case-histories. The "critical" and "systematic" publications of other more established branches of medicine are simply not available. Case-histories are in fact the medical equivalent of the measurement of quantities in the pure sciences.

Some medical writers (Winterstein 1937/38, Knoll 1938), more especially those who are extensively quoted in the lay press, abound in general statements about the medical implications of boxing but fail altogether to satisfy the above demand. Winterstein, for example, instead of presenting evidence, gives highly speculative psychological interpretations of incidents in the ring. On the other hand, experienced research workers like Parker, Guttmann, Bowman and Blau, Carr and Moody, and the Director-General of Health of New Zealand (Dr. Watt), have presented admirable case analyses. In evaluating the evidence I have laid emphasis upon this latter category. Every good case description was carefully considered and, if deemed advisable, included in my book. I did not hesitate to describe in detail Guttmann's excellent history of a case of paralysis of the right anterior serratus muscle in a boxer, while rejecting unsupported and medically valueless statements on punch-drunkenness. With regard to the latter condition, my own observations as well as a critical review of the few case-histories available in the literature showed me that we are not dealing with a clinical or pathological entity but with a multitude of conditions which still await an analytical neurological study. This is in agreement with the view expressed, for the first time, by E. Guttmann and myself in 1933. I therefore confined myself in my book to the presentation of original evidence never before collected, without drawing premature conclusions on its pathological significance. I abstained from discussing topics of which I have no personal experience; that is why the manifold ophthalmological problems of boxing are not treated in my book.

Finally, I asked myself whether the evidence at my disposal allows the drawing of definite *practical* conclusions. In the past the reluctance of research workers to apply conclusive scientific evidence to practical issues has been to the disadvantage of medicine. Notwithstanding that our knowledge of the medical aspect of boxing is as yet incomplete—knowledge is never complete—it is my considered opinion that the collected evidence warrants the demand that *boxing be eliminated* from all educational institutions and from the armed forces.

ERNST JOKL.

Witwatersrand Technical College, Johannesburg.

Crowther, J. G. British Scientist of the Nineteenth Century, Penguin, 1940. Winterstein, C. E. *Lancet*, 1937, **2**, 719; *Med. World, Lond.* 1938, **11**, 427. Knoll, W. G. *Med. Klin.* 1938, **34**, 1125. Parker, H. L. *J. Neurol. Psychopath.* 1934, **15**, 20. Guttmann, L. *Deut. Z. Nervenheilk.* 1937, **114**, 83. Bowman, K. M. and Blau, A. in Brock's Injuries of the Skull, Brain and Spinal Cord, Baltimore, 1940. Carr, J. L. and Moody, A. M. *Calif. West. Med.* 1939, **51**, 227. Watt, M. S. personal communication. Jokl, E. and Guttmann, E. *Münch. med. Wschr.* 1933, **80**, 560.

## EXCLUSION OF NEUROTICS FROM THE FORCES

SIR,—May I endorse Dr. Minski's letter of Sept. 27? It is by now becoming obvious to those of us who work in the field of psychiatry that the psychotic and psychoneurotic are unsuitable persons for active service in the Forces. I believe this view to be shared by combatant officers. I admit that such a generalisation is capable of modification in individual cases. Dr. Minski's suggestion that a psychiatric examination should be available at the time of medical examination appears entirely reasonable and not too difficult of arrangement. That medical examination boards should have all specialist services at their call is surely desirable.

To the story of the epileptic who had enlisted five times I would add that within an hour of reading Dr. Minski's letter I heard that a youth whom I had examined in 1939 when he was a schoolboy, and whom I considered to be a schizophrenic with a bad prognosis, had just been "discharged from the Army."

Taunton. R. SESSIONS HODGE.

## HOME GUARD PROBLEMS

SIR,—Mr. Abel seems to have been singularly unfortunate in his relations with the Red Cross. In my case, far from proving "so exsanguinated by red tape as to be almost invisible on its white background," the Red Cross has proved an exceptionally full-blooded friend in need to the Home Guard. Not only has the Red Cross Society accepted the responsibility of completing the equipment of casualty collection posts to a rather more exacting standard than that laid down by Mr. Abel but they have also relieved at least one Home Guard medical officer of a great amount of the office work involved in the setting up of these posts. Whilst a thinly populated rural district does not call for the establishment of a C.C.P. at intervals of not more than one mile, it does demand a sufficiently high standard of equipment and staff to enable casualties to be cared for at posts over a period of possibly many days, and it is solely due to the energy and freedom from red tape complexes shown by the British Red Cross Society that this has been accomplished in my area.

H. MARCUS BIRD.

SIR,—Your correspondents agree that in case of invasion casualties are most likely to occur in isolated country districts where there are few facilities for coping with them, and that Home Guard M.O.s should equip casualty collecting posts wherever they may be needed. May I endorse Dr. Sinclair-Loutit's suggestion that they will find competent assistants in the local district nurses—women who by training and experience are equipped to cope with any emergency, to assume responsibility in the absence of a doctor, and to improvise when orthodox material and methods are not available? The district nurse knows the neighbourhood, the buildings, the people. She can advise on the choice of a post, and organise her own local team of helpers. Most important of all, she can be left, under instructions, to deal with the casualties while the sorely pressed M.O. goes to other places more urgently needing him. The doctor could have no more reliable deputy.

J. ELISE GORDON,
London, S.E.1. Editor, *Nursing Mirror*.

## CORROSIVE STRICTURE OF THE STOMACH

SIR,—The interesting account given by Mr. C. A. R. Schulenburg in your issue of Sept. 27 reminds me that I have been remiss in not reporting a case of this nature which occurred at the Royal Free Hospital in 1938.

Man aged 32. Admitted under Dr. Lee Lander June 3, 1938, having swallowed "considerable quantity" of strong HCl. Usual remedies applied at once. June 6, began to vomit. By the 16th, when he had a hæmatemesis, vomited practically everything he took. Hæmoglobin, 54% five days after hæmatemesis, rose slowly to 60% on Campolon and ferrous salts.

July 8: test-meal showed complete achlorhydria. Blood present on this and other occasions. June 28: barium meal revealed normal œsophagus but advanced atresia of pyloric end of stomach, little evidence of barium passing through. July 8: barium meal showed more gastric dilatation, no barium was passed through in 24 hr. July 15: I carried out a partial gastrectomy for almost complete stenosis extending from pyloric ring proximally for nearly 2 in. Mucosa of this portion of the stomach completely replaced by vascular granulation tissue, proximal to which was abrupt transition from inflamed part to normal gastric wall.

Aug. 4: patient left hospital in excellent condition having gained 5 lb. following operation.

As in Mr. Schulenburg's case the onset of stenosis was rapid, indeed it appears to have been nearly complete at the time of the first barium meal. I have not had the time to search the literature but as partial gastrectomy is not mentioned in Mr. Schulenburg's article presumably it has not been adopted before, yet it appears to me to have advantages over mere short-circuiting operation since it extirpates a segment of the stomach that is extensively damaged and the site of changes which may well develop into chronic ulcer of a peptic or even malignant nature. In my own case there were no special technical difficulties to overcome and the light percaine spinal anæsthetic with which I am accustomed to work was well borne.

Harley Street, W.1. CECIL A. JOLL.

## STRETCHER SUPPORT FOR THOMAS SPLINT

SIR,—Mr. W. G. Morden, of the Beckenham civil defence service, has designed the simple piece of apparatus here illustrated for the use of stretcher parties transporting a patient wearing a Thomas splint. The cost of material is negligible and the fitting can be made by any handy man within an hour. The fitment is intended for use with the standard pattern A.R.P. wire stretcher. It eliminates the need for the regulation suspension bar and requires no delicate adjustment. Made from ¼ in. iron rod and a piece of sheet tin it can be instantly adjusted to give support at any point along the length of the splint by a simple flexion movement. It measures 10 in. by 10 in. by 9 in. high.

Beckenham, Kent. T. PHILIPS COLE.

## WASP AND BEE STINGS

SIR,—In Dr. Dyke's interesting paper in your issue of Sept. 13, in the report of case 2, this sentence occurs: "One of the girls, with commendable presence of mind, put ammonia on the site of the sting. . . ." So used I to do, and the last time this resulted in my wife having the worst wasp-sting I have ever seen. Now that I know better I put vinegar on and have never had a moment's anxiety since adopting this method, even with what I should once have considered serious stings of the lips, tongue or fauces. As far as I know the necessity for using dilute acids for wasp-stings and dilute alkalis for bee-stings was first pointed out by Mr. Edward R. Speyer in a letter to the *Times* of Aug. 20, 1919, which was commented on in the *Lancet* for Sept. 6, 1919 (p. 445). An interesting correspondence on this subject ran in the *Times* from Aug. 20 to Sept. 9, 1938.

Guildford. OSMOND H. BROWN.

## INGROWING TOENAIL

SIR,—Mr. Nuttall's article of July 26 and Mr. Bonnin's letter the following week renewed an interest in ingrowing toenail which I have long felt. With Mr. Bonnin I consider that Mr. Nuttall's summary of the ætiology—"tight shoes"—does not cover all the cases. Like Mr. Bonnin I have noticed a decidedly familial tendency and cannot believe this is due to tight shoes. Choyce's "System of Surgery" states that it generally occurs in young adults; in men more often than women. My own experience accords with this view both as regards the age and sex of the majority of these patients. If the ætiology is solely tight shoes would it not be reasonable to expect that the cases would be much more numerous among women and that many cases would be found in later life? Both the occurrence in several members of one family, parents and siblings, and the shape of the nail lead me to believe that a certain proportion of cases are congenital defects or rather variations from what we consider normal. It does not seem accurate to say that "there is no ingrowth of the toenail" in this group of cases. Although many ingrowing toenails are flat and cannot be said to be ingrown a certain proportion are definitely curved in the horizontal plane and this variation seems to run in families. The free border of the nail, as viewed from beyond the tip of the toe, is not merely slightly curved but forms almost half an ellipse as shown in the drawing. The abnormality commonly occurs in children. This curvature of the nail must produce an exceptionally deep lateral nail fold which would surely not increase the pressure on the skin from the edge of the nail if the shoes are tight but rather decrease it, since now the nail border is parallel to the lateral nail fold and the lateral pressure would appear to be less likely to cause ulceration by pressure on the nail edge. A case I have recently seen caused me to query the effect of tight shoes. A lad of twenty had been in bed in this hospital suffering from rheumatic carditis, and of course had worn no shoes of any kind; immediately before this illness he had been in the R.A.F. for fifteen months. After fourteen months in bed he developed "ingrowing toenail" with severe sepsis on both sides of both big toenails. He had deep creases on either side of the nails which were exceptionally curved, and he denies ever wearing tight shoes; we know that this is true for at least 2½ years before his toes began to cause trouble. Can medical officers with wide colonial or other native experience tell us whether the condition we call ingrowing toenail is found in races who do not wear shoes?

Horton Emergency Hospital. E. J. RADLEY SMITH.

# Obituary

## CHARLES LEONARD DIGBY ROBERTS

M.B. EDIN., D.T.M. & H.

Dr. Charles Roberts, who remained in Guernsey to look after the civilian sick during the German occupation, died in St. Peter Port on April 12 soon after undergoing a major operation. He was born in Exmouth in 1882 and graduated from Edinburgh University in 1908. He came to Bart's to study for the English fellowship, and passed the primary examination. But he became interested in tropical medicine and went out to India, where he spent the greater part of his professional life. For some years he was medical officer at the Charteris Hospital in Kalimpong, a remote outpost which was the railhead for many Mount Everest expeditions. At the outbreak of the last war he joined the Indian Medical Service, and saw service in the Waziristan and Persian Gulf campaigns. After the war he practised for a short time in Darjeeling before he went to Assam, where he was medical officer to the Mariana Tea Association for many years. When he retired from India he went to practise in Guernsey, where he had hoped to enjoy a well-earned rest.

Roberts's chief hobby was the study of natural history, and in India he amassed a fine collection of butterflies. Some of his specimens were new discoveries and are preserved in the Natural History Museums in South Kensington and Bombay. His knowledge of the flora of the Channel Isles delighted those who accompanied him on his energetic walks along the cliffs and country lanes.

Dr. Roberts is survived by his wife, daughter and three sons. The sympathy of all will go out to Mrs. Roberts in her lonely exile.

## Infectious Disease in England and Wales

WEEK ENDED SEPT. 27

*Notifications.*—The following cases of infectious disease were notified during the week: smallpox 0; scarlet fever, 1258; whooping-cough, 2247; diphtheria, 1066; paratyphoid, 100; typhoid, 32; measles (excluding rubella), 745; pneumonia (primary or influenzal), 485; puerperal pyrexia, 123; cerebrospinal fever, 94; poliomyelitis, 38; polio-encephalitis, 3; encephalitis lethargica, 6; dysentery, 89; ophthalmia neonatorum, 98. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 24 was 1246; including scarlet fever, 137; diphtheria, 272; measles, 23; whooping-cough, 534; enteritis, 24; chicken-pox, 29; erysipelas, 24; mumps, 7; poliomyelitis, 3; dysentery, 13; cerebrospinal fever, 15; puerperal sepsis, 9; enteric fevers, 42; malaria, 1; polio-encephalitis, 2; other diseases (non-infectious), 35; not yet diagnosed, 76.

*Deaths.*—In 126 great towns there were no deaths from measles, 3 (1) from enteric fever, 1 (0) from scarlet fever, 15 (1) from whooping-cough, 28 (1) from diphtheria, 43 (2) from diarrhœa and enteritis under 2 years, and 3 (0) from influenza. The figures in parentheses are those for London itself.

Greater London, Watford and Blackburn each reported a death from enteric fever. There were 4 fatal cases of diphtheria and 3 of whooping-cough at Liverpool.

The number of stillbirths notified during the week was 187 (corresponding to a rate of 32 per thousand total births), including 14 in London.

## Medical News

### Royal College of Surgeons of England

The following demonstrations, which are open to advanced students and medical practitioners, will be delivered at the college in Lincoln's Inn Fields, London, W.C.2, during October at 2.30 P.M.: Oct. 13: Dr. A. J. E. Cave, constitution of the skull; 14: Mr. L. E. C. Norbury, benign neoplasms of the rectum; 15: Dr. Cave, vascular arrangements of the head and neck; 16: Mr. Norbury, malignant neoplasms of the rectum; 17: Dr. Cave, lymphatics of the head and neck; 20: Dr. Cave, surgical anatomy of the nasal fossa; 21: Mr. R. Davies-Colley, diseases of the testicle; 22: Dr. Cave, surgical anatomy of the mouth and jaws; 23: Mr. C. E. Shattock, tumours of the kidneys; 24: Dr. Cave, surgical anatomy of the pharynx and larynx; 27: Dr. Cave, surgical anatomy of the liver and bile ducts; 28: Mr. Davies-Colley, tumours of the intestines; 29: Dr. Cave, surgical anatomy of the kidney and ureter; 30: Mr. Shattock, tumours of bone; and 31: Dr. Cave, surgical anatomy of certain nerves.

### University of Birmingham

Dr. Stanley Barnes has retired from the office of dean of the medical faculty which he has held for ten years. In accepting his resignation the council passed the following resolution:

For nearly 40 years, in addition to being actively associated with the local hospitals, Dr. Barnes held a pre-eminent position as a consultant. He sacrificed a lucrative practice to enable him to assist with the planning and building of the Hospitals Centre and the new buildings of the Medical School at Edgbaston. He always set for himself and others a high ideal of learning and scholarship, and staff and students for many years have owed much to him for the ability and unflagging zeal he has showed in promoting the interests of the Faculty with which he has been so closely associated. He has given liberally to the building funds of the Medical School, and the excellence of the building and equipment, generally acknowledged to be unsurpassed elsewhere, reflect in many directions the effect of his constant supervisory care.

Prof. Leonard Parsons, who has been deputy to Dr. Barnes for some years, has now been appointed dean. Dr. Parsons will continue his work as physician to the United and the Children's Hospital and regional officer for the Midlands to the Ministry of Health.

Prof. Lancelot Hogben, F.R.S., who has held the chair of natural history in the University of Aberdeen since 1937, has been appointed to the chair of zoology at Birmingham in succession to Prof. H. Munro Fox.

### C.S.M.M.G. Salaries

The Chartered Society of Massage and Medical Gymnastics has recommended the following scale of salaries. It has been approved by the Ministry of Health for members of E.M.S. hospitals qualified in massage, medical gymnastics, medical electricity, and light therapy.

| | Resident | Non-Resident |
|---|---|---|
| Chartered masseuse or masseur | £85–£10–£115* | £210–£10–£240* |
| Where only one masseuse or masseur is employed .. | £115–£10–£145 | £240–£10–£270 |
| Charge masseuse or masseur— | | |
| Where two masseuses or masseurs are employed .. | £145–£15–£175 | £270–£15–£300 |
| Superintendent masseuse or masseur— | | |
| Where three to ten masseuses or masseurs are employed | £175–£15–£205 | £300–£15–£330 |
| Where more than ten masseuses or masseurs are employed | £205–£15–£235 | £330–£15–£360 |
| Permanent part-time appointments (21 hours' work per week) .. .. .. .. | | £130 per annum |
| Sessions of 3 hours or less .. .. .. | | 10*s.* 6*d.* |

* After 5 years' service with same authority, and if recommended, 3 further annual increments of £10.

Members required to hold the additional certificate in hydrotherapy should be allowed a further £5 per annum, and those required to hold qualifications of other organisations, such as S.R.N., M.S.R., a further £20 per annum. Length of service and experience should be taken into consideration, and where no superannuation scheme is in operation the salaries given above should be increased. Where cost of living additions are granted the special bonuses should be in addition to the minimum figures given on this scale.

### Naval Honours

The R.N.V.R. officers' decoration has been awarded to Surgeon Commander George McCoull, M.D. Durh., and to Acting Surgeon Commander G. F. S. Parker, M.R.C.S.

### Medical Casualty

Surgeon Lieut.-Commander C. D. D. de Labillière, M.R.C.S., R.N., has been reported missing presumed killed, after the sinking of H.M.S. *Fiji* off Crete in May.

### Medical Society of London

A meeting of this society will be held at 11, Chandos Street, London, W.1, on Monday, Oct. 13, at 4 P.M. After the presentation of the Fothergillian medal there will be a pathological meeting.

### Shaftesbury Military Hospital Medical Society

A meeting of this society will take place at the hospital on Tuesday, Oct. 14, at 3 P.M., when Colonel J. M. Weddell, consulting surgeon to the Army, will survey the present position of surgery in the army.

### Royal Medical Society of Edinburgh

Sir William Wheeler will open the new session of this society on Friday, Oct. 17, at 8 P.M. when he will give an address on what society has gained by the progress of surgery. During the session addresses will be given by Colonel F. A. E. Crew, Prof. G. B. Fleming, Prof. A. T. Jurasz, Dr. J. Trueta and Prof. Samson Wright. The annual dinner will not be held this year.

## Births, Marriages and Deaths

### BIRTHS

ALCOCK.—On Oct. 1, at Oxford, the wife of Squadron-Leader N. S. Alcock, M.R.C.P.—a daughter.

BURDEN.—On Sept. 29, at Alverstoke, Hants, the wife of Surgeon Commander A. J. Burden, M.B., R.N.—a daughter.

CAMPBELL.—On Oct. 1, at Cambridge, the wife of Captain E. C. Campbell, M.R.C.S., R.A.M.C.—a daughter.

HENDERSON.—On Oct. 1, at Pitlochry, the wife of Captain Walter Henderson, M.D., R.A.M.C.—a daughter.

HIGHAM.—On Sept. 29, at Didsbury, Manchester, the wife of Major A. R. C. Higham, F.R.C.S., R.A.M.C.—a son.

INGLIS.—On Sept. 28, in Glasgow, the wife of Dr. W. Elder Inglis, a son.

### MARRIAGES

BOWEN-JONES—CORBETT.—On Sept. 14, at Liverpool, John Anthony Bowen-Jones, M.B., surgeon lieutenant, R.N.V.R., to Eileen Anne Corbett.

MANSON—MILLER.—On Oct. 1, at Streatham, London, Malcolm Manson, M.D., to Margaret Miller, M.B.

MOLE—BROOK FOX.—On Oct. 2, at Halberton, Richard H. Burnell Mole, M.R.C.S., to Catherine Rosemary Brook Fox.

### DEATHS

CROSSE.—On Oct. 5, at Brundall, Herbert William Crosse, M.D. Edin., barrister-at-law.

KERR.—On Oct. 5, at Edinburgh, James Kerr, M.A., M.D. Camb., D.P.H., sometime school medical officer of London.

KERR RUSSELL.—On Oct. 5, William Kerr Russell, M.D. Durh., Ross-on-Wye, late of Harley Street, W.1.

WOOD.—On Sept. 27, Leonard Wood, M.R.C.S., colonel, late R.A.M.C., of Westbury, Wilts, aged 67.

YOUNG.—On Sept. 26, at Leeds, George Young, M.B. Glasg., late of Cockermouth, Cumberland.

## Appointments

BARKER, KATHLEEN, M.R.C.S.: R.M.O. at Ilford maternity home.

BRASS, J. C., M.R.C.S.: R.S.O. at Poplar Hospital.

COOKE, R. C. H., M.B. Dubl.: R.M.O. at Bromsgrove Hospital.

DUNSMUIR, ALAN, M.B. Glasg.: temp. asst. M.O.H. and asst. school M.O. for Blyth.

ELDER, C. L., M.B. Glasg., D.P.H.: deputy M.O.H. for Middlesbrough.

FIRMIN, DOREEN, M.B. Camb., M.R.C.P., D.P.M.: temp. deputy medical superintendent at Caterham Hospital (L.C.C.).

LANDER, C. L., M.B. Lond.: examining factory surgeon for Maiden Newton, Dorset.

PARIS, WILLIAM, L.R.C.P.E., examining factory surgeon for Alyth, Perthshire.

PETRIE, BERYL G., M.B. Aberd., D.P.H.: temp. M.O. (maternity and child welfare) for Blackpool.

STEWART, M. A., M.B. N.Z., D.M.R.: asst. M.O. at Sheffield radium centre.

SWITZER, S. LE R., M.A. Camb., M.R.C.S., D.P.M.: first asst. M.O. at Tooting Bec Hospital (L.C.C.).

TIPPETT, G. O., M.B. Lond., F.R.C.S.: surgical registrar at the National Temperance Hospital, London.

WILSON, A. C., M.R.C.S.: consulting psychotherapist to the State Criminal Lunatic Asylum, Broadmoor.

WRIDE, FANNY, M.B. Lond., D.P.M.: temp. asst. M.O. for Holborn.

# Notes, Comments and Abstracts

## HOME GUARD MEDICAL ARRANGEMENTS

Brigadier E. M. COWELL, F.R.C.S.

SOME notes on Home Guard medical arrangements from the Corps point of view, prepared for the course recently held at St. John's College, Cambridge, may perhaps be found useful for a wider circle.

*Regimental Medical Officer.*—The Home Guard medical officers appointment is not a sinecure. He has an immense amount of work to do in the next few weeks. Instruction of the battalion, company and platoon officers in field hygiene, sanitation and first-aid is his first task. Secondly, he must train his medical orderlies and regimental stretcher-bearers, the establishment of which is authorised. He must see that he has the equipment to which he is entitled and that it is tactically distributed. Company and platoon aid posts may possibly be required in addition to the aid posts and points of the Civil Defence Services.

*Administration and Organisation.*—In each zone the appointment of a medical adviser is now officially recognised. In many areas it is agreed that this officer should be a member of the public health service, either a senior M.O.H. who has made the civil medical arrangements himself, or his deputy or junior who is familiar with the existing arrangements. By coöpting the Civil Defence into the Home Guard many difficulties will be overcome. These zone advisers must work in close contact with the A.D.M.S. area, who will do everything to help. This officer is responsible to the D.D.M.S. corps for all details.

*Invasion Committees.*—An excellent plan has been initiated in East Anglia, whereby invasion committees have been established in counties, boroughs, urban and rural districts with smaller committees in every parish. These committees are completely representative and all invasion plans are prepared including defence, fire, food and medical. Those counties and authorities who have not yet established these committees are urged to do so without delay. Medical representation is essential.

*First Aid Posts.*—Keep the terminology simple. The Army Medical Services recognise R.A.Ps., C.A.Ps. and possibly platoon aid posts. The Civil Defence Services have F.A.Ps. which are posts or points. All these posts are "collecting"; the term C.C.P. is confusing, redundant and unnecessary. A small "medical packet" containing the bare minimum of supplies should be sealed and kept in safe custody where it will be required.

*Conclusions.*—The task is urgent and consists not so much in providing and establishing new organisations as in coördinating and "buttoning up" existing arrangements which belong, for the most part, to the Civil Defence Services. Provision of medical supplies is adequate; wise distribution must be carried out.

## THE TOOTH OF THE DANE

THE shaming partnership between civilisation and bad teeth has been freshly illustrated by Christophersen's study of 316 skulls in the National and Anatomical Museums of Denmark.[1] The owners lived in the bronze and stone ages and champed away at the tough and simple diet which their essays in hunting and agriculture brought to the table—or possibly the floor. They had teeth which in occlusion, alveolar shape and position resembled those of their descendants; but their molars were stout and strong, their incisors were up to their work, and the older the eater the better his teeth. Caries was found in only 1·6% of 3612 permanent teeth examined, and only 15% of 274 adults had any caries at all. Among children caries was present in only 7%, but was found in 2·4% of 168 milk teeth. A coarse diet evidently did its work in cleansing and strengthening the teeth and in smoothing away those irregularities, fissures and cavities which favour the development of caries. These rude forefathers make a fine contrast to their posterity, whether in Denmark or elsewhere. Frandsen,[2] who made a study of 1200 contemporary Danish children found only 4 with completely sound dentitions. Regular dental care, it seems, falls to the lot only of children with well-to-do parents. The bad state of children's teeth is being used as an argument for establishing an organised national dental service in Denmark and for arranging for the systematic treatment of school children.

1. Christophersen, K. M. *Nordisk med. Tidskr.* March 1, 1941, p. 687.
2. Frandsen, O. *Ibid*, p. 688.

## SCIENCE AND ETHICS

THE conference last month at the Royal Institution was evidence of the tremendous urge to find the right place of science in this disordered world. A symposium in *Nature* (Sept. 6) was directed towards defining the relations between science and ethics. Mr. C. H. Waddington, Sc.D., points out that increasing scientific knowledge, notably in the fields of anthropology, sociology and psychology (if this last is yet worthy to be called a science) has done much to destroy traditional ethical conceptions. Science is, however, in a position to make, and indeed cannot avoid making, a contribution to the new ethics since ethics are based upon facts of the kind with which science deals. So far few would wish to dispute with him, but he goes on to say that because a thing works it must be right and good. Thus, "we must accept the direction of evolution as good, simply because it is good according to any realist definition of that concept." But some of his critics join issue with him here. Julian Huxley reminds him that the majority of evolutionary trends are irrelevant to progressive change and that evolutionary progress is a rare phenomenom. This being so it would surely be wiser to accept evolutionary changes as a series of phenomena *outside* the scope of ethical judgment. Dr. Waddington is convinced that ethics cannot be avoided since they are part of the large system of compulsions and prohibitions which begins to develop in infancy. Here, he thinks, lies the practical difficulty. The young child may be taught that an aggressive attitude towards others must be controlled; but how and when is he to be taught that aggression includes, for example, the adoption of an unscientific attitude towards the social problem of nutrition? We should all like to have Dr. Waddington's faith that the fundamental notions of the scientific outlook will seep into the minds of mothers and nurses and so be unconsciously transmitted by them to the young. He wonders whether an adequate psycho-analytical study of those who have grown up in Soviet nurseries might not provide interesting evidence on this point. It has been observed, with cynicism no doubt but also with truth, that when confronted with two or more courses of action we choose the one that we least dislike; but it is the moral education we receive which determines what courses of action we like or dislike. It is surely one of the functions of science to equip us with the special knowledge to enable us to think clearly and so to act morally.

## SHILLING A NIGHT

THE thirteenth annual report of Cecil Houses (Inc.) contains Miss Eleanor Farjeon's account of an evening at one of them; to read it is to share in the party. Every evening in the Cecil Houses must be such a party—a meeting of friends at home to exchange news and views, sympathy and jokes. Not many of us can buy such a chance for a shilling a night; but those who would like to keep the party going should write to Mrs. Cecil Chesterton, founder and hon. secretary, at 193, Gower Street, London, N.W.1.

---

Dr. James Macfarlane of the Department of Health for Scotland has been appointed medical liaison officer at the Scottish Office in London, and at the medical intelligence section of the Ministry of Health. He will maintain liaison with the medical branches of the service departments and other government departments in London.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS.—On Saturday, Oct. 25, at 2.30 P.M., Mr. W. C. W. Nixon will deliver the fourth Blair Bell lecture. His subject will be diet in pregnancy.

THE LOAN OF A MICROSCOPE.—The education department of the Royal College of Nursing needs additional microscopes for laboratory work in the sister-tutor course. Owing to the present difficulty in procuring these the director would be grateful to hear from anyone willing to lend or hire one or more microscopes to the college for the session.